INDEX.

	PAGE.
STATEMENT OF THE CASE	1– 17
The Patent	2
The Art to which the Patent Relates	2– 5
The Points at Issue	5– 15
Construction of the Patent	5– 7
Effect of Disclaimer	6– 7
Infringement	7– 8
Short Statement of the Prior Art	8– 10
Position of the Jones Invention in the Development of the Art	10– 12
Treatment of Prior Uses, &c., by Petitioner	12– 15
Defendant's Points	15– 17
BRIEF OF ARGUMENT	18–222
General Statement of the Position of the Parties in Regard to the Patented Invention	18– 21
Petitioner alleges the patented invention to be the basis of the manufacture of steel from blast furnace metal	18
Proofs show this manufacture to have been well established before invention	18– 19
The patentee's sole novelty was in the use of a relatively larger intermediate reservoir for molten metal	19
The intermediate reservoir for molten metal was well known, both by use and prior patents	19– 20
The only room for inventive conception was in mode of use of well known apparatus	20
Petitioner's witnesses and counsel claim that mode of use covered by patent is that now commonly practiced.	20– 21
Respondent claims that mode of use covered by patent is essentially different from modern practice	21
The law as to prerequisites of patent protection and its effect as to the thing patented	22– 24
The Patented Invention	25–103
(1) It is a method of mixing molten pig iron to a substantially uniform composition to obtain products which will be practically homogeneous, particularly in the distribution of silicon and sulphur	25– 54

	Page.
This is clearly and emphatically stated in the specification	25- 37
The use of a residue is stated as a factor tending toward uniformity	31- 32
The alleged difficulty of securing uniformity in using the mixing receptacle as a reservoir is not inconsistent with Jones' purpose to secure uniformity, because his patent indicates the successive charging and discharging of the reservoir, and not its use as a place of storage	32- 37
The claims of the patent are consistent with the specification, and for a method of mixing to a substantially uniform composition	37- 39
The testimony of Carnegie as to the disclosure and exhibition of the invention to him by Jones shows that it was for mixing to a substantially uniform composition	39- 41
The file wrapper and contents of the patent application show that limitation to uniformity of composition was the sine qua non of the grant	42- 46
The original application was for a method of storing and mixing	42- 43
This was rejected on prior patents	43
The application was amended after rejection to limit the claim to mixing to a uniform composition and eliminate all reference to storing	43
The argument presented in connection with the amendment was based on assertion that storage of metal was inconsistent with uniformity of composition	43- 45
The amended application papers, covering mixing to uniform composition as distinguished from mixing incidental to storage, were re-sworn to	45- 46
Patent Office proceedings show that there was never an intention to limit the patent on the use made of the mixed iron	46
Review of the Opinion of the Circuit Court as to the Limitation of the Patent on Mixing to a Uniform Composition	47- 54
The views of the Circuit Court Judge as to the nature and object of the mixing were derived from petitioner's experts, not from the patent	47- 48

PAGE.

Petitioner's experts had not even read the patent when they explained the invention 47- 48
The Circuit Court premises its opinion by the statement that the difficulties to be overcome were peculiarly incident to Bessemerizing..... 48
As a matter of fact the patent nowhere suggests difficulties in Bessemerizing, or purports to offer a cure for such difficulties..... 49
The inconsistency and logical impossibility of the Circuit Court's construction..... 50- 53
As between the advantage of the Jones process of mixing to a uniform composition, and the advantage of storing the metal without obtaining uniformity, the steel trade has elected storage..... 53
If patent limited to mixing to substantially uniform composition there is no infringement..... 53- 54

(2) The method covered by Claim 2, while it requires the employment of a residue of mixed metal from previous charges as an ingredient of each charge of metal mixed, does not require, nor does the patent suggest, that this residue shall be dominating or preponderating 54- 63

Facts previously discussed (pp. 32-37) establish this... 54- 55
The dominance of the residue is the essence of the so-called invention claimed for Jones..... 55- 56
Nothing in specification indicates that the residue should be dominating or preponderating..... 57- 58
The language of the second claim implies a small residue and excludes limitation on dominance of residue... 58- 60
The errors of the Circuit Court as to the dominance ef the residue..... 60- 63

(3) The method covered by Claim 2 is a method of mixing pig metal irrespective of the use afterward made of it, and is not limited on the use of the metal in making Bessemer steel..... 64- 68

This is expressed in the clearest language both in the specification and claims..... 64- 68
This is moreover clearly shown by the patent office proceedings..... 68

(4) The patented method is not limited on the mixing of metal drawn directly from the blast furnace but covers as well the mixing of re-melted pig metal..... 68- 71

	PAGE.
Comparson of claims shows exclusion of this limitation from second claim	69
Language of specification clearly includes both direct and re-melted pig metal	69
Jones apparatus application specifically includes cupola metal as molten metal	69
As direct and re-melted metal are the same no legitimate distinction between them can be made	70–71
(5) Some minor errors in the construction of the patent in the Circuit Court	72–73
As to size of portions charged to mixer	72
As to limitation of the method claimed on the use of covered receptacle	72–73
(6) Conclusion as to the construction of the patent	74–77
Changes in claim 2 necessary to make it express the construction put upon it in the Circuit Court	75–76
The Disclaimer	77–103
The disclaimer is ineffective to change the meaning and scope of the patent as issued	77–82
The so-called disclaimer does not disclaim a "thing" previously claimed	78–79
Its expressed intention is merely to erase from the specification certain words	78–79
Even if effective to make erasures the construction of the second claim would not thereby be changed	80–82
The so-called disclaimer filed is not a legal disclaimer because it does not purport to do anything which disclaimers are by law effective to accomplish	83–101
The statutory authority for disclaimers	83–84
Historical development of the statutory law with regard to amendments	84–85
What amendments can be made by re-issue and what by disclaimer	85–88
Decisions of the Courts as to disclaimers	88–101
Class of patents which can be amended by disclaimer.	88–89
Supreme Court decisions as to disclaimers	89–97
Cartridge Co. vs: Cartridge Co. 112, U. S. 624	89–92
Hailes vs. Albany Stove Co. 123, U. S. 582	92–94
Collins vs. Coes, 130 U. S. 56	94
Hurlbut vs. Schillinger, 130 U. S. 456	94–95
Sessions vs. Romadka, 145 U. S. 29	95

PAGE.

Grant vs. Walter, 148 U. S. 547 95–97
Decisions of the Circuit Court as to disclaimers 97–101
Additional step or element cannot be added by disclaimer 99–101
Petitioner's so-called disclaimer estops it from claiming patent to be valid until after its legal amendment 102–103
Infringement 104–125
The facts as to respondent's use established by stipulation 105–106
Petitioner now seeks to vary stipulation as inconsistent with the statements of respondent's witness Morgan... 106
What Mr. Morgan testifies 107–109
The purpose of petioner in disputing stipulation is to establish intentional use of dominant residue which, even if true, could not be a fact establishing infringement... 109–111
Respondent's plant and practice 111–112
The mixing by respondent's practice is not to a uniform composition, and the mixed metal cannot produce articles of a single order of homogenous composition 112–115
Respondent's mixing is simply such as is incident to storage 114–115
The absurdity of petitioner's position as to respondent's practice 115–121
Respondent's position as to infringement 121–122
The generally large residue in respondent's practice is not a factor tending towards uniformity or avoidance of abrupt variations in silicon 122–123
The so-called admission of infringement by respondent's witness, Morgan, depends upon hypothetical construction of patent embodied in same answer, and is offset by Carnegie's testimony as to true nature of process as well as by proper construction of patent 124–125
The Crying Need 126–139
The great need in the Bessemer Art was for Storage Reservoirs, and this increased in the early '90's because of increase in blast furnace output 126–131
Blast furnace metal had been extensively and successfully used for years before Jones' invention 126–128
Reservoirs were needed as balances between furnaces and converters 128–129

PAGE.

Great output of late years, increasing from 50 to 400 or 600 tons per day, has made storage the controlling element 129–131

Petitioner Has Abandoned Jones Method and Employs Its Vessel for Its Reservoir Function 131–139

The records show very abrupt variations in the metal mixed in petitioner's vessels 131–133

Much more uniform metal would be obtained by charging and discharging vessel, as it would give a number of converter charges of identical admixture 133–137

The variation between batches would be less than petitioners present practice 135–137

Petitioners practical working and results prove that its mixer metal is irregular 137–139

The Prior State of the Art Considered as a Whole 139–150

The usage of the Car Wheel Foundries 139–140

The use of the intermediate storage ladle in the Bessemer works 140–141

The Kirk publication 141

The Tabberner patent 142

The Deighton patent 142–143

Holley 1877 Report 143–157

Holley's account of Moss Bay plant 143–145

Holley's account of West Cumberland practice 145–146

Holley's published account of Snelus's proposed reservoir, and additional publications of the same matter .. 147–149

The drawback in using direct metal for Bessemerizing and the "obvious" remedy as stated by Holley 149

Conclusions as to the mixing of metal stated by Holley 149–152

What Holley's report did disclose and why, as Carnegie states, it did not disclose the Jones invention .. 152–155

The different objects had in view by Holley and by Jones 154–155

What was done by the steel manufacturers after Holley's report 155–157

The prior art shows that there was no room for invention in devising a practice of mixing to uniform composition 157–158

PAGE.

Kirk's Founding of Metals 159–162
Discloses entire principle of maintaining residue and so mixing to provide more uniform metal 161–162
Whitney and Like Car Wheel Practice 162–179
This usage was practically identical in method and object with the patented Jones process 162–164
The metal from the three cupolas was mixed in a large reservoir ladle kept well filled up and small portions of the mixed metal withdrawn for casting 165–166
Metal from cupola furnaces was irregular in metalloids so as to make castings imperfect 166–168
The mixing gave practicaliy uniform product 166–169
Whitney shows every step of Jones second claim 169–170
While Circuit Court correctly found that Whitney's purpose was product uniformity, it erred in holding that this was not Jones' purpose 171–172
Whitney's preliminary step of selecting the pig metal is the same in kind as Holley's recommendation to improve blast furnace practice 173–174
Whitney's cupola metal was "molten metal" such as called for by the patent 174
There is no distinctive point in the use to which the mixed metal was put 175
Authorities bearing on cupola foundry practice 175–179
Furniture Spring case—Lovell Mfg. Co. vs. Cary 175–177
Glue Soup case—Leggett vs. Standard Oil Co 177–178
Mitis Steel case—Mitis Co. vs. Carnegie Co 178
American Bessemer Accumulating Ladle 179–193
Respondent's present practice same as followed in American steel works sice 1865, including respondent's and petitioner's works 179–185
The molten cupola metal was irregular and required mixing before use 185–188
There was no selection in respondent's cupola practice, pig metal being charged promiscuously into the cupolas. 186–187
The cupola ladle was kept well filled up by additions from the various cupolas 186–187
The mixing in the reservoir was followed as *the means* of obtaining more uniform metal 187–188

PAGE.

Recognition of the applicability of the practice to the treatment blast furnace metal 188
Circuit Court's objections to cupola ladle practice shown to be without foundation 189–190
Small residue give more uniform mixture than large or so-called dominating residue 190–193

Tabberner, 1856, British Patent 193–195
This describes respondent's present reservoir practice and was recognized by the Circuit Court as necessarily disclosing incidental mixing 193–194
Only rejected by Circuit Court because it did not disclose dominent pool 194

Deighton, 1873, British Patent 195–207
Deighton's purpose was the same as Jones: to get a better average metal, more suitable for making Bessemer steel of uniform quality 196–197
He shows the Jones plant, and describes *one*, two or more blast furnaces feeding into a large intermediate mixing vessel, and withdrawing weighed charges therefrom 197–198
The irregularity in blast furnace *practice* necessarily led to irregular times of tapping into the vessel 199–200
The custom was to tap the blast furnaces in rotation to maintain supply for the converters 200
Interpreted by prior art, Deighton discloses respondent's reservoir practice 201–202
Practical working of Deighton plant would inevitably require the same 202–204
Petitioner's numerous and amazing distinctions between Deighton and Jones 204–206
Circuit Court found that Deighton disclosed storage and incidental mixing, and only rejected it because it did not disclose the dominant pool 206–207

Witherow Patents 207–211
Witherow in disclosing storage necessarily disclosed the idea of incidental mixing 208–209
Proportionate sizes of blast furnace hearth and storage receptacle prove that there must have been mixing of successive casts 210–211

PAGE.

Patentability 211–218
Pictorial Summary of the Art 212–213
No new principle, result or distinctive point shown 214–215
All mixing operations analogous, difference only in degree 216
Authorities on Patentability 217–218
The Shifting Constructions of Patent contended for by Petitioner in view of the showing as to the prior state of the art 219–222

IN THE

United States Supreme Court.

IN EQUITY.

CARNEGIE STEEL CO., Petitioner,
vs.
CAMBRIA IRON CO., Respondent.

Brief for Respondent.

Statement of the Case.

This suit was originally brought in the United States Circuit Court for the Western District of Pennsylvania by the Carnegie Steel Co., for an alleged infringement of Letters Patent No. 404,414, granted to William R. Jones June 4, 1889, for Improvement in Method of Mixing Molten Pig Metal.

It was the second suit brought under this patent, an earlier suit having been brought in the District of Maryland against the Maryland Steel Co., which was finally abandoned by the complainant, against that defendant's protest the evidence in that suit being stipulated under the present case (p. 848).

Infringement was originally alleged of both claims in both of said suits, but after the taking of all of respondents proof in this suit the first claim was withdrawn (p. 459.)

After the argument in the Circuit Court a disclaimer was entered (p. 672.)

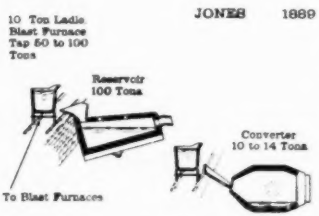
The Circuit Court, in a long opinion, held the disclaimer effectual and the amended patent valid and infringed as to the second claim (pp. 673 to 712.)

The cause was heard in the Circuit Court of Appeals by Judges Acheson, Dallas and Kirkpatrick, who by a unanimous opinion reversed this decision, holding the patent to be not infringed, the disclaimer ineffectual, and to be clearly anticipated if construed to cover defendant's practice (pp. 1117 to 1122).

The cause is presented to this Court as a review of said decision of the Circuit Court of Appeals.

The Patent.

The patent in suit is for a method of mixing molten pig metal; and it covers a special mixing process to obtain a **uniform product of steel or iron** from pig metal which is irregular in its contents of sulphur, silicon, phosphorus, etc., commonly known as "metalloids" or "non-metallic constituents".



Petitioner originally claimed infringement of both claims, but finally withdrew claim 1, which was of broader scope.

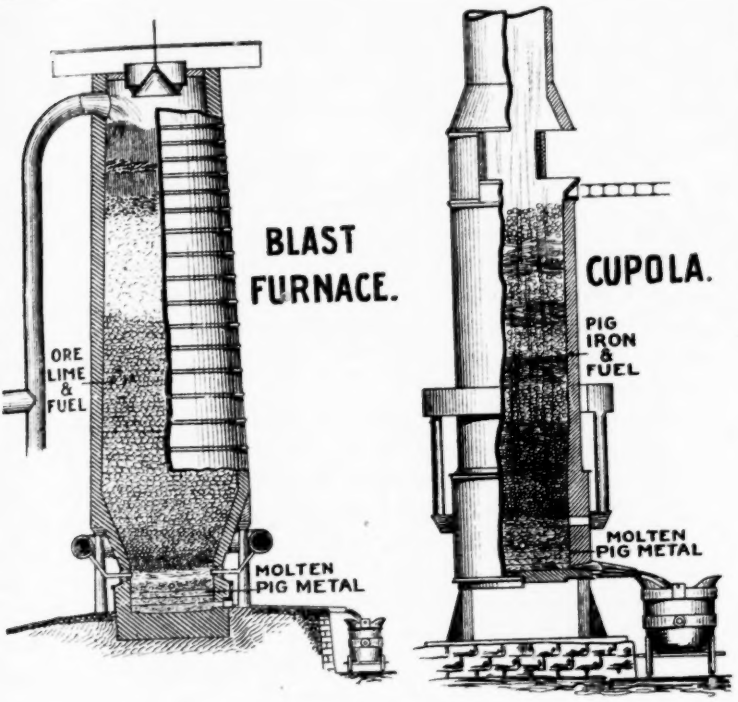
The actual process of mixing is well set forth in claim 2, the only one in issue, which is as follows:

> 2. *In the art of mixing molten metal to secure uniformity of the same in its constituent parts* preparatory to further treatment, the process of introducing into a mixing receptacle successive portions of molten metal ununiform in their non-metallic constituents (sulphur, silicon, etc.,) removing portions only of the composite molten contents of the receptacle without entirely emptying or draining the same, and successively replenishing the receptacle with fresh ununiform additions, substantially as and for the purposes described.

The Art to Which the Jones Patent Relates.

Pig metal is simply crude iron as smelted from the ore and known from time immemorial. It is used for conversion into steel by several methods—for making castings—for conversion into wrought iron by the puddling process—and for other purposes.

It is used either as produced by the blast furnace, which is shown in the accompanying cut, or it is cast into pigs, from which



the term "pig metal" comes, and is then remelted in a cupola such as shown in the accompanying cut, and the remelted metal used in the same way. As to this the Century Dictionary, under the title "Iron," states as follows:

> "By the processes ordinarily followed, wrought-iron and steel are made not directly from the ore, but from iron which has been smelted in the blast furnace or that which has the form of cast iron. The name, 'cast iron,' however, is ordinarily given to iron which has been remelted in the cupola furnace and cast in any form desired for use. The product of the blast furnace, out of which wrought-iron and steel are made, is called 'pig iron;' **but its qualities are not sensibly changed by simply remelting and casting.**"

The patent in this case relates to a method of mixing pig metal which consists of the elemental substance known as "iron" mixed, or more properly we believe alloyed with a number of other substances generally known as "metalloids," or as the patent calls for "non-metallic constituents." Among these the principal and most

influential are carbon—silicon—sulphur and—phosphorus—each of which have certain well known influences on the quality of the iron or steel made from the iron, so that the presence and percentage of these non-metallic constituents is a matter of great importance in practice.

In the metallurgy of iron much attention is had to the character of the ore and of the fuel used in the process of smelting as affecting the percentage of the non-metallic constituents in the iron produced, but the percentages of these substances differ even with the most carefully selected ores and fuels, and the variations in such percentages also occur owing to the irregular workings of the blast furnace in the smelting of the iron, though this has of late years been much improved.

The means devised and in common use in the art for producing iron of approximately uniform composition were:

(1) Careful selection of ore and fuel.

(2) Careful running of the smelting furnace.

(3) The mixing together of different batches of pig metal so as to average up their contained non-metallic constituents.

The mixing of the iron in order to average up their different constituents was carried on in the art in what may be called two different ways, although properly considered there is no great difference between them.

(1) By one plan the mixing was accomplished in the cupola furnace, above referred to, by selecting from different batches pigs which would average up to approximately the desired composition and melting them together in the cupola furnace, the molten iron mixing in the crucible or hearth of the furnace and being drawn therefrom of approximately the desired composition.

(2) The other method was to run or dump the iron to be averaged up, *in a molten condition*, into a receiver, reservoir or mixer in which the constituents of the total charge of molten iron has an opportunity to, and did, thoroughly diffuse themselves through the entire mass, according to the well known law of diffusion applicable to all liquids or metals in molten condition, so that the iron drawn from the receptacle was of homogenous composition.

It is to this *last mentioned method* of mixing molten pig metal that Jones' invention relates, purporting to be as he states in his first paragraph of his specification (p. 871) "Improvements in Methods of Mixing Molten Pig Metal." That is to say, the

general method of mixing the molten pig metal being old Mr. Jones claims to have invented a particular method of manipulation to effect this mixing, the subordinate method claimed being, of course, that which is described and pointed out in the specification.

As the true nature of Mr. Jones' mixing method is a matter as to which the parties radically disagree, and in which the Circuit Court and Circuit Court of Appeals have taken diametrically opposite views, in this preliminary part of the brief which is intended simply as a statement of the case, we will simply present the issues as we understand them.

The Points at Issue.

Construction of the Patent.

The main issue is the proper meaning and construction of the patent. That being definitely fixed the case is not a complicated but a remarkably simple one. The question of infringement and of anticipation by the various prior uses and publication, and the question of patentability in view of the state of the art can easily be determined when the real invention of the Jones patent is ascertained by examination of the specification and claims.

We, the respondents, assert that the method of mixing molten metal covered by the 2nd claim, is—

(*A*) A method of mixing the metal to a substantially homogeneous composition to the end of getting a practically uniform product from its further treatment in any way; and in which—

(*B*) The mixing receptacle is successively charged, discharged and replenished with portions of molten metal, ununiform with respect to each other; which treatment is—

(*C*) Further characterized by the fact that the mixing receptacle is not entirely drained, a portion of the mixed metal of substantially average composition being left to mix with the fresh ununiform metal with which the vessel is successively replenished.

Furthermore, our contention is that the distinguishing and distinguished features of the invention, as described and claimed, lies in the mixing to an average or substantially standard composition with regard to silicon and sulphur to the sole end of uniformity of product; as contrasted with the mixing incident to storage in which the composition of the mixed metal is not regulated to an average or approximate standard, but varies from time to time; the

matter of product uniformity governing in the one case while the matter of storage governs in the other.

The petitioner on the other hand, asserts that the method covered is—

(*A*) A method of mixing without regard to uniformity of product, but with the sole object of avoiding sudden variations in the silicon contents of converter charges successively drawn from the mixer, and treated in the manufacture of Bessemer steel and in no other manner, in which—

(*B*) The various ununiform charges of molten metals (drawn from blast furnaces exclusively) are successively and continuously run into the mixer, while converter charges are at the same time successively and continuously poured out of the mixer; this treatment being—

(*C*) Characterized by the fact that the mixer is always kept practically full of molten metal which thus forms a dominating pool of varying composition with which the incoming charges mix.

That is to say, the petitioner has endeavored to make the Jones patent cover specifically such a mixing as inevitably occurs as an incident to delivering fluid into a reservoir from which it is drawn for use.

Furthermore, the petitioner claims that the real purpose of the invention was not to secure a homogeneous or uniform product, but solely to facilitate the operation of Bessemerizing the molten metal, in which operation sudden variations in silicon are alleged to give rise to trouble, avoided when the variations are less abrupt.

The Judge of the Circuit Court adopted the construction of the patent contended for by the petitioner; and the Judges of the Circuit Court of Appeals adopted the construction for which we contend.

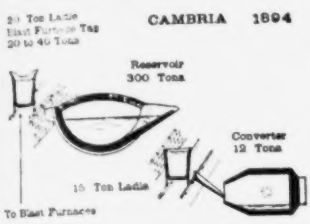
Effect of Disclaimer.

There is also to be considered the effect, if any, produced by the so-called disclaimer filed by the petitioners after the argument, by which it was sought to alter and change the meaning of the specification and scope of the claims (confessedly invalid as including more than the patentee's invention), and thereby limit it to what they claimed the patentee had really invented. This so-called disclaimer the respondent believes to be totally inoperative, except as a formal admission of the invalidity of the patent, be-

cause it attempts to do what we believe can only be done, if at all, by re-issue, but apart from this we also claim that it is ineffective to change the scope and meaning of the specified invention. The Circuit Court of Appeals has so held, though the Circuit Court accepted it as limiting the patent.

Infringement.

It is not claimed that we necessarily infringe because we have a large intermediate reservoir between the blast furnace and converters by which we maintain supply and balance of quantity; and it is amply shown that such a plant was not new with Jones but had been in use with Bessemer plants and metal casting plants long before the so-called Jones invention.



The defendant's practice is set forth in a stipulation (p. 64) and it is not disputed that all the product of the blast furnaces as the metal is produced and without discrimination or selection, is charged into the immense reservoir; that the metal is drawn from it for use in converters as required by them in the ordinary running of the plant; and that the supply is generally sufficient to keep the vessel more than half full. The stipulation shows that the amount of metal present is governed by supply and demand and varies from nothing to the full capacity.

It is also agreed that the composition of the metal drawn from the reservoir is by no means uniform, but varies within quite wide limits with regard to the percentage of silicon and sulphur in the charges sent to the converters.

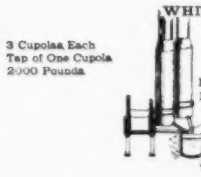
The one point of disagreement arises from an attempt made by the petitioner to show that at respondent's works not only is it true, as the stipulation sets out, that the reservoir is generally more than half full, but that this is a matter of precaution, respondent's operatives exercising care to prevent the depletion of the reservoir beyond this point. We disagree with this contention, because we do not think it deducible from the evidence, but from our point of view it is not material in its bearing on the question of infringement.

We deny that our method of using our reservoir infringes upon the Jones patent, because we admittedly do not mix the pig metal in such a way as to produce from the reservoir mixed pig metal of substantially uniform character in its non-metallic constituents, viz.: silicon and sulphur, and because such admixture of the metal as is produced in our reservoir is only such as is necessarily incident to the use of an intermediate reservoir for storing the metal, said reservoir being arranged to receive the metal as it is produced from the furnaces and to hold it until it is required for the converters.

The petitioner claims that we do infringe the patent because, while our use of the reservoir admittedly does not produce uniform pig metal, it does, to a certain extent, prevent *sudden variations* in the composition of the metal drawn off for use in the converters, and thus, while not producing uniform iron or uniform steel, afford a guide to the operatives of the converter by which they are enabled to carry on the process of Bessemerizing with less trouble and less liability to make defective batches of steel than would be the case if they were using the metal as it came from the furnaces instead of after it had been stored in the intermediate reservoir.

Short Statement of the Prior Art.

Respondents have shown that the mixing of molten metal, either direct from the blast furnaces or remelted in cupola furnaces, was a common practice for forty years prior to the Jones invention, and had been fully described both as a special means of making the metal uniform, and incidentally in connection with the storing of metal in reservoirs until it was needed for use. The following instances are among those proven in the case:

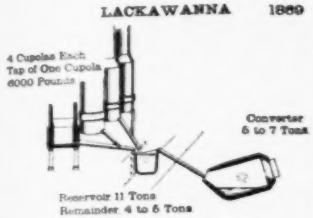


At the Whitney Car Wheel Works, Philaeldphia, commencing in 1847 (pp. 115–124), to get uniformity of composition, the metal was tapped at intervals from three cupolas into a large reservoir, permitted to mix and even up in it, and small charges withdrawn to be cast into car wheels, the reservoir being maintained at least half full.

In Kirk's Founding of Metals (p. 822–4) is described the use of this large ladle or reservoir so arranged that the iron can run

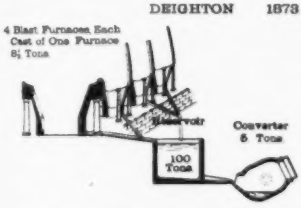
into it from the cupola as fast as it is melted, and mixed therein, the mixed metal being poured into smaller ladles, and the mixer never emptied.

In 1856 the Taberner British patent (p. 963) described the use of a number of small smelting furnaces and the collection of the molten metal therefrom into a large reservoir, from which the molten metal was drawn for casting. This treatment, of course, necessarily included the incidental mixing of the metal.



From the beginning of the Bessemer art in America, extending back earlier than 1870, every American works employed an intermediate reservoir ladle to receive the metal from a number of cupolas and maintain a supply for the converters, the ladle holding in some cases two and one-half times the converter charge, so that a remainder was left after pouring off a charge, and the incoming metal mixing with the remainder in the vessel. At Lackawanna they used the ladle for both converters and foundry casting, (141-142).

Blast furnace metal had been used abroad since 1857 for making Bessemer steel—and as early as 1871, at the Terre Noire Works' they mixed it by taking half the converter charge from one furnace and half from another (p. 750), it being stated that they "always obtain a mixture of the metals, and therefore the greatest regularity is secured to the rest of the work."



In 1872 the Deighton English patent (p. 982) described the process of the use of a large mixing vessel to receive the metal from several blast furnaces and mix it so as to obtain a more uniform quality of metal for the converter, the practice outlined necessarily involving, we think we have shown, the maintainance of a remainder in the reservoir.

The advantage of the use of an intermediate storing and mixing reservoir which the cupola ladle reservoir with blast furnace metal to be Bessemerized was early recognized both in this country and abroad. For example, Mr. Holley in 1877 described their in

tended use at the Vulcan Works at St. Louis (p. 796–7)—and Mr. Snelus in 1878 described the employment of this ladle to take the metal from the blast furnace as being "of considerable importance both for saving time and for facilitating the admixture of iron" (p. 789), its purpose being "to receive the metal from the blast furnaces and hold it in readiness so that at a moment's notice you could take your iron into the converter and also obtain a better mixture." The same idea of the use of the reservoir extended throughout the report (pp. 832–46) made in 1877 by Mr. Holley to the steel makers in America, as hereafter fully discussed.

Direct blast furnace metal was first used in this country for Bessemerizing in 1882, by the Illinois Steel Co., who were quickly followed by the Carnegie Co., who continued for five years handling 940,049 tons (p 69). They carried their metal in large ladles to the converters, sometimes filling the ladles from two or more furnaces. This practice of using direct metal and mixing it, continued with the Illinois Steel Co. until 1892 (p. 263).

The Witherow American patents of 1885 (pp 941–46) describe and claim the use of large reservoirs between the blast furnaces and converters for the specific purpose of storing the metal tapped at long intervals from the furnaces and supplying the metal at short intervals to the converters.

The Position of the Jones Invention in the Development of the Art.

Properly considered the patented Jones invention has no position in the development of the art.

When Mr. Jones filed his application in the patent office he described and **claimed a process of storing and mixing** molten pig iron (p. 725). This subject matter having been rejected by the patent office examiner as being fully disclosed in older publications Mr. Jones redrew his specification and claims, **carefully eliminating all reference to the storage** of molten metal and strictly limiting his invention, both as described and **claimed,** to a method of mixing the molten metal in such a way as to secure **substantial uniformity** in its composition and to the end of secur-

ing p[illegible]ucts from the further treatment of such metal which will be h[illegible]geneous in composition and consequent characteristics. (p. 7[illegible]30.)

T[illegible] amended application, the subject matter of which differed so wi[illegible]y from the process of storing and mixing that the patentee felt hi[illegible]self obliged to file a new affidavit to the fact of invention, was p[illegible]ed to issue by the Patent Office Examiner on the representation [illegible] the applicant's attorney, that in all previous manipulation of the [illegible]olten metal in which it was stored, the incidental mixing was never to a uniform composition. (p. 730.)

It would appear from the testimony of Mr. Carnegie (p. 428) that the Jones process of mixing to a uniform standard composition was originally introduced into the Carnegie works, but it is clear from the depositions of other witnesses that it was promptly abandoned, and the practice adopted of using the mixing vessel provided for the Jones process as a reservoir into which the metal from the furnaces was dumped indiscriminately, and from which the converters were charged without regard to uniformity in the composition of the metal.

Saving only the short use of the Jones method as patented at the Carnegie works, **no one in the steel business has ever undertaken to mix the molten metal to a substantially uniform composition,** therefore the Jones inventon as patented, even if it were new, has no place in the development of the art of mixing metal as applied in steel manufacture, save as an unsuccessful and rejected expedient.

Finally the Jones invention, as patented, is shown to be anticipated by the common usage of the car wheel foundries, all of which mixed their molten metal to a uniform composition, and the later practice of the Carnegie Works, that of storage of the molten metal with merely incidental mixing and without attainment of uniformity in composition was simply a return, or step backward to the common usage of the art. The very practice distinguished and disclaimed by Jones in the patent office proceedings and a practice abundantly shown by evidence, both oral and documentary, to have been old in practice and universally known to those skilled in the art.

It is true that the Jones apparatus, constructed in accordance with his other patent, not in suit, to wit: 404,415, page 876, while installed for the purpose of carrying out the Jones method of mixing to a uniform composition, proved very suitable for the storage

of large masses of iron in accordance with the old practice, and it is also true that Jones and the petitioner company were the first to store metal on such a large scale, although in the prior patent to Deighton and in the Moss Bay plant described in Holley's Report, the inventors and builders had provided for storing and mixing receptacles of substantially the same capacity as that built by Jones. As the other steel manufacturers were confronted with the problem of storing immensely increased volumes of molten metal, they also installed **gigantic reservoirs** and every one of them, the Illinois Steel Company, the Maryland Steel Company and the Cambria Iron Company, the respondent, **with absolute disregard of the Jones patent,** none of them embodying those features covered by the apparatus patent to Jones, and none of them using or thinking of using the Jones method, but simply continuing in their large receptacles, and with their increased product the old practice of storing with incidental mixing which they had all practiced with their remelted metal.

So far from the patent in suit having ever been recognized it is a patent which has been passed upon by a jury of steel manufacturers and by all of them disregarded.

The temptation to control the steel manufacture of the present day has led the present petitioner to claim that the Jones patent covers respondent's storage of the molten metal, and to accomplish this, respondent believes that the patent has been given a false interpretation, being twisted and molded like the nose of wax referred to by Mr. Justice Bradley.

Treatment of the Anticipations by Petitioner.

In the consideration of the mass of facts shown by the evidence of witnesses and by the publications, the witnesses, particularly those called for petitioner, have by no means confined themselves to the bearing of the facts shown upon the novelty of the specified Jones process. In fact petitioner's expert witnesses in their consideration of the facts proved have provided for themselves two standards of comparison, one the Jones process of the patent in suit, and the other the, so-called, Jones process which they allege to be in use at the works of the plaintiff company and which does not materially differ from the defendant's use.

The double standard of comparison is exceedingly useful, enabling them to discriminate in the case of one set of prior uses or

prior publications by reason of their lack of provision for *a uniform and homogenous product* such as they point out Mr. Jones provides for in his specification. This set of prior methods is not the same as the Jones method, they tell us, because it is only such mixing as is incident to storage.

Then passing to the consideration of another set of prior use and publications they point out that the methods described are not the same as those used by the defendant or the Carnegie Company in that they provide for the production of a uniform pig metal as the result of the mixing, something which neither the defendant nor the Carnegie Company does in practice and which, they tell us, would be impracticable in commercial use. In fact the double standard adopted by the plaintiff has, for it, all the advantages which the double monetary standard, at a ratio of 16 to 1, would have, if it were possible to buy for silver and sell for gold.

While as respondent reads the patent, the use of any considerable residue of mixed metals would be within the scope of the claimed invention, as against proof of certain prior uses or publications showing the use of such a residue in mixing molten metals, the petitioner sets up the claim that the patent calls for and is limited to the use of a residue in the mixer which is preponderating in quantity and dominating in both quantity and quality; and yet where the prior art shows the use of such a dominating residue, petitioner distinguishes this from the Jones invention because the metal is remelted and not taken directly from the blast furnaces.

Where we have proven the identical mixing process where the mixed pig metal was used for making castings, the petitioner's insist that the Jones method exists only where the mixed metal is used for making Bessemer steel.

The main difficulty we have met with in presenting questions of anticipation and novelty arises from the persistent refusal of petitioner's counsel and witnesses to consider the patented invention as all patented inventions must from the law of their existence be considered, to wit, as a concrete and definite thing to be ascertained from the specification and claims of the patent. They have from the beginning of the proceedings practically ignored the patent, and substituted for it in considering both infringement and novelty, a nebulous, shifting theory of what they are pleased to call the Jones invention. The deliberate intention to ignore the patented invention is shown from the examination of their first expert wit-

ness, Gayley, who, after testifying as to what he believed the Jones invention to be, was asked on cross examination, (p. 36, × Q. 35) whether he had read and was familiar with the patent, and he answered: "I have never read it." By their next expert, Kennedy, who was asked to examine the patent, "not as a patent specification, "but as an illustrated description of a method of mixing molten pig "metal." (p. 445.) By their next expert, Fry, who states, (× Q. 36, p. 598) that he had only read the claims, and not the specification, because patent specifications "are rather dull reading." And their last expert, Metcalf, who states, (× Q. 36, p. 633) that he had "only read the patent over casually," and did not even know that it described the practice of the method in the charging ladle. Naturally these witnesses were but little restricted in their explanation of what the invention was and the reasons for considering it novel and infringed. Their idea of the Jones invention was taken not from the patent but from a practice which has grown up in the Carnegie Works intermingled with the patent and read into it, while parts of the patent were emasculated at free will of the witnesses. The inevitable result of the substitution of the witnesses' ideas for the invention actually specified in the patent was to make it as pervasive and intangible as a pestilence. In considering prior uses, conditions and distinctions were evolved without difficulty; while it was, of course, a matter of the greatest ease to show that respondent's practice was within this alleged invention.

Where such distinctions and theories were set up it was natural for respondent to answer the same, as the Court will appreciate that there was good cause for respondent's witnesses to follow up and demonstrate the fallacy of the theories propounded by petitioner's witnesses, and which had for their object to make out that Jones was a great inventor who had given to the art an invention of pre-eminent practical importance, and one therefore which was to be treated with the greatest respect, irrespective of the way in which it was described and claimed in the patent.

As respondent understands the patent itself, which is of course the test of all questions in the case, and as that patent was construed by the Court of Appeals, the question of novelty in view of the state of the art is of minor importance, as it is clearly not infringed, because respondent does not mix to a standard composition, which was the main idea of the Jones patent and was distinctly so made in view of the prior art showing storage.

If, on the other hand, the patent can legitimately bear a construction which would hold the respondent as an infringer, the art is full of prior uses and publications showing the reservoiring as practiced by repondent to be old and therefore necessarily anticipating the patent.

Defendant's Points.

As to Construction of Patent.

I.

The Jones invention is a method of mixing Molten Pig Iron to an average or substantially uniform composition with regard to its non-metallic ingredients, and for the purpose of obtaining products from the mixed iron which will be practically homogenous in composition; particularly in Silicon and Sulphur.

This is shown—

(*a*) By the clear and emphatic statement of the specification.

(*b*) By clear and unavoidable inference from other statements of the specification.

(*c*) By showing that the alleged difficulty in securing the specified object (uniformity), which difficulty the petitioner claims indicates a different intention, is based on an assumed mode of mixing with a dominating residue which is not specified and is contrary to the clear intention of the patentee.

(*d*) By the clear limitations of the claims.

(*e*) By the testimony of Mr. Carnegie.

(*f*) By the evidence of the Patent Office Proceedings.

(*g*) By an analysis, (showing its fallacies,) of the opinion of the Circuit Court judge to the contrary.

II.

The method covered by claim 2 of the patent, while it requires the employment of a residue of mixed metal from previous charges of the mixer as an ingredient of each charge of metal mixed, does not require,, nor does the patent even suggest, that the residue should be dominating or preponderating.

III.

The method covered by the second claim of the Jones patent is a method of mixing pig metal irrespective of the use afterwards

made of the mixed metal, and is in no manner limited to the use of the metal for making Bessemer steel.

IV.

The patented method of claim 2 is not limited to the mixture of metal drawn directly from the blast furnace, but covers as well, the mixing of remelted pig metal. *Lovell Mfg. Co. vs. Cary*, 147 U. S. 623; *Leggett vs. Standard Oil Co.*, 149 U. S. 287; *U. S. Mills Co. vs. Carnegie Co.*, 89 F. R. 343.

As to the Disclaimer.

V.

The disclaimer is ineffective because, even if were effective to make the verbal changes it seeks to make, it still does not materially change the meaning and scope of the patent.

VI.

The disclaimer is ineffective because it does not in fact disclaim anything, but seeks merely to rewrite the specification. Something which can only be done by reissue, if at all. *Cartridge Co. vs. Cartridge Co.* 112 U. S. 624.

VII.

The disclaimer is ineffective because its asserted purpose, viz: to convert a patent—for mixing molten metal to a standard composition: into a patent for an improvement in the Bessemerizing process, is something which cannot be effected by disclaimer.

VIII.

The filing of the so-called disclaimer estops the plaintiff from claiming that the patent is valid until its admittedly defective specification is amended.

Infringement.

IX.

The defendant does not infringe because it does not mix its pig metal to a substantially uniform standard of composition, but secures only such mixing as is incident to the storage of its molten metal between the producing and consuming parts of the plant.

X.

Though the Jones mixing method might have had advantages in producing uniform product, it was inapplicable to and useless

in the making of Bessemer steel, and was abandoned even by the Carnegie Company, the great needs in the Bessemer art being storage and reservoirs, which need increased in the early 90's because of the vast increase of blast furnace output.

The Prior Art.

XI.

The general state of the art as proved negatives any invention by Jones in the conception of or practice of his patented process of mixing.

XII.

The Jones patent, as to claim 2, is anticipated by the prior usage of the Car Wheel Foundries and the Kirk publication.

XIII.

If the patent is not limited to such mixing of molten metal as produces uniform composition; that is, if it includes respondent's reservoir practice, with merely incidental mixing, it is also anticipated by the

Tabberner Patent;
Bessemer Ladle Cupola Practice;
Deighton Patent;
Witherow Patent ; and
Reservoir Practices Described by Snelus and Holley.

BRIEF OF ARGUMENT.

General Statement of the Position of the Parties in Regard to the Patented Invention.

The petitioner's witnesses and counsel assert with the utmost aggressiveness that the Jones patent, upon which this suit is based, is for an invention lying at the base of, and practically the key to, an advance in the art of making Bessemer steel which they claim to be of almost as much importance as the original invention of Sir Henry Bessemer. It is, indeed, this alleged importance in the invention in controversy which formed the principal basis of the petition for the *Writ of Certiorari* upon which the case has reached this Court.

The alleged departure or new development in the art of making Bessemer steel is the use in the Bessemer converters of molten pig metal drawn from the blast furnaces in which it is smelted instead of the use of the same pig metal after it has been allowed to cool in pigs and remelted in cupola furnaces.

The petitioner's claim is a startling one in view of the indisputable facts of the case, because the use of the metal direct from the blast furnace was (1) recommended in Sir Henry Bessemer's original patent (p. 948); (2) the universal practice from the very inception of the Bessemer process on the continent of Europe; quite generally in use in England beginning with the early 70's; (754-5; 764-6; 779, 787, etc.) and used in this country on a large scale by the Illinois Steel Company and this petitioner beginning in 1882. (262; 25).

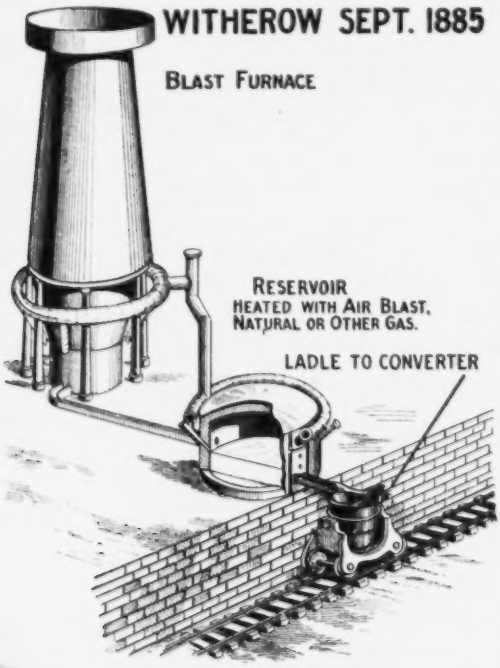
But the petitioner waives aside the proof as to the extensive prior use of the so-called direct process, asserting that it was all very unsatisfactory and of no particular advantage over the use of remelted metal until Mr. Jones made and introduced his invention at the works of the Carnegie Co. The introduction of the so-called Jones mixer they tell us gave an impetus to the direct process which removed it from a competitive basis with the so-called indirect process, to wit, the use of remelted metal.

That the petitioner exaggerates with regard to the advantages of the use of direct metal even under present conditions, and that the use of the remelted metal is still on a competitive basis with regard to it is, we think, manifest by the fact that *remelted metal is still used on an enormous scale*, not only generally throughout

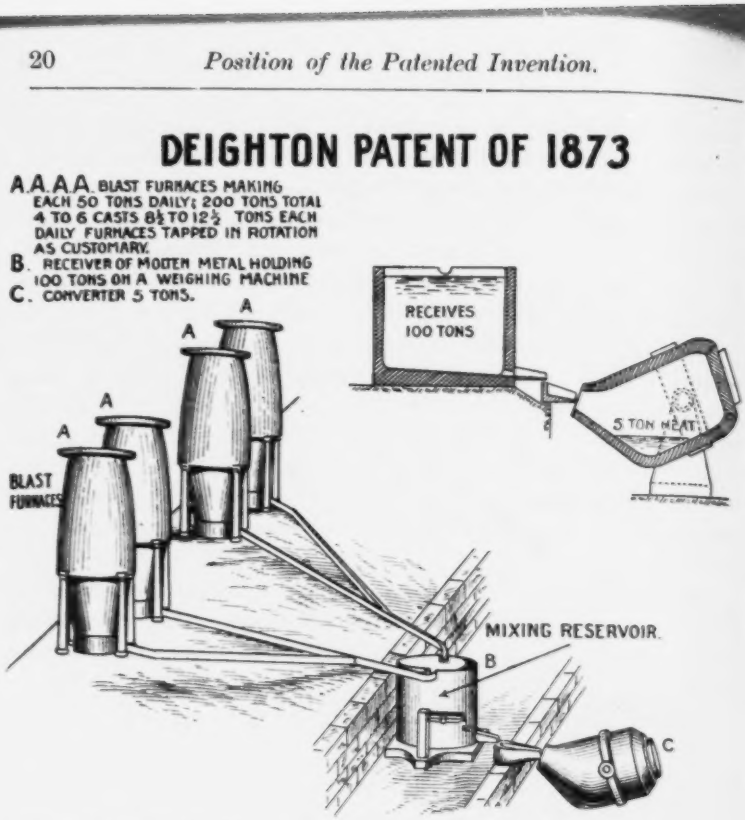
the country, but even in the works of the petitioner and in the works of the defendant company, the *petitioner itself making millions of tons* (2,000,000 tons at Duquesne and 1,696,037 tons at Homestead,) (p. 591), extending through a period of *ten years after the grant of the Jones patent*, which, on the basis of sixty-five cents per ton, the advantage claimed by petitioner, would have saved Carnegie over $2,500,000.

It is no doubt true that the use of direct metal in connection with an intermediate reservoir is advantageous over such use without the reservoir, just as this practice proved better with cupola metal. Jeans on Steel p. 368, showing that in the early 70's the English manufacturers only obtained from 12 to 15 blows or operations of the converter in twenty-four hours, while the American manufacturers, who were using the cupola ladle, obtained about 20 blows.

But petitioner claims that under the direction of Captain Jones it was the first to use a large intermediate reservoir to receive metal directly from the blast furnaces, and furnish a supply to the converters; and it is this claim which unquestionably impressed the learned Judge of the Circuit Court, and led him to construe the Jones patent with disruptive expansiveness. This priority of actual use forms the whole substance of petitioner's case.



It is not asserted that Jones performed any inventive act in conceiving of or erecting an intermediate reservoir, such


DEIGHTON PATENT OF 1873
A.A.A.A. BLAST FURNACES MAKING EACH 50 TONS DAILY; 200 TONS TOTAL 4 TO 6 CASTS 8½ TO 12½ TONS EACH DAILY FURNACES TAPPED IN ROTATION AS CUSTOMARY.
B. RECEIVER OF MOLTEN METAL HOLDING 100 TONS ON A WEIGHING MACHINE
C. CONVERTER 5 TONS.
A
A
A
A
BLAST FURNACES
RECEIVES 100 TONS
5 TON HEAT
MIXING RESERVOIR.
B
C

conception being venerable in the art; as shown for example in the Deighton English Patent (p. 982) and Witherow U. S. Patents (p. 941, 944) the Whitney practice (p. 115 to 24); the function of such devices both as places of storage and means for mixing and averaging up the pig metal, whether drawn directly from blast furnaces or remelted in cupolas, had been carefully studied and formed the subject of numerous patents and publications.

Obviously, therefore, the only room for invention lay in devising a peculiar and novel mode of using the intermediate reservoir and the fundamental inquiry in this case is, therefore, —what is the particular mode of use specified and claimed as a new method in the patent in suit ?

Petitioner's witnesses and counsel, with constant reiteration of the unimportant fact that Jones was the first to erect an intermediate vessel for use with blast furnaces, described the practice with this reservoir as now followed both in petitioner's great works and

those of respondent, and claimed that this practice was the invention of Jones, and covered by the 2nd claim of his patent.

Respondent's position is that the modern use of the intermediate storage reservoir is utterly different in the most vital particulars from the mode of use described in the Jones patent, so different—that it is not even suggested in the specification—that it is absolutely inconsistent and incompatible with the use described and claimed therein—that the modern use, if subsequently patented, could not be held to be anticipated by anything described in the Jones patent, although, as we shall show, it would be anticipated by publications prior to the Jones invention.

It will also be shown that this modern use of a reservoir is precisely the thing carefully distinguished from the Jones process in the prosecution of his application for patent, and in effect disclaimed.

Finally, we shall show that at the time Capt. Jones developed the invention he described and illustrated its true character to Mr. Carnegie, called as a witness for petitioner, in such way as to clearly mark its absolute difference and inconsistency with the method now used by both parties to the case.

In fact the position established by the patent and the evidence of the Patent Office correspondence and the testimony of Mr. Carnegie, to whom Mr. Jones explained his invention, is that the modern and present mode of use was not contemplated by Captain Jones when he took out his patent and was not then considered by him except as a pre-existing method to be discriminated against and distinguished. The only alternative to this position is the finding that if Captain Jones actually contemplated and intended the use of the reservoir as it is now used, he deliberately suppressed and concealed this idea and intention and certainly if it is not disclosed in the patent it cannot be covered by its claims.

The Law as to Prerequisites of Patent Protection as Bearing on Possible Breadth of Scope.

It is beyond doubt that the Jones invention whether it is a great or little invention must be found described in the patent and must be with reasonable accuracy defined in the limit of its claims.

The Patent Act provides certain prerequisites to the grant:

1st. His application, as filed, must state the invention "in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it pertains, or with which it is most nearly connected, to make, construct, compound and use the same;" (R. S. § 4888).

2d. He must also "particularly point out and distinctly claim the part, improvement, or combination, which he claims as his invention or discovery" (R. S. § 4888); and

3d. He must make affidavit that he believes himself to be the original inventor of the thing "for which he solicits a patent," (R. S. § 4892).

4th. The law requires that the officials of the Patent Office "shall cause an *examination* to be made of the *alleged new invention* or discovery;" and if found to be "new" and "sufficiently useful and important the Commissioner shall issue a patent *therefor*," (R. S. § 4893).

The provision of the Patent Act carrying out the purpose of the Constitution, "the promotion of the useful arts," require that a full disclosure of the invention may be made and the scope of the monopoly fixed, by the joint action of the inventor and the patent office, first, that the public may know and respect it; and second, that at its expiration the public may use it. Full disclosure and accurate definition are required by public interest, and this being provided for the interests of the inventor are carefully guarded, provision being made for **amendments** to enable the applicant to clearly define his invention in view of the prior art, and **appeal after appeal** being provided in the Patent Office, and after that to the Federal courts. After issue of the patent the patentee's interests are still carefully guarded by the liberal provisions of the statutes as to **reissue and disclaimer,** so that the patentee can always conform his patent to the true invention it was intended to cover.

The tendency to disregard these essential conditions in the lower courts has been so marked that this Court has constantly felt itself called upon to restate and enforce the elementary statutory provisions lying at the basis of the whole system, as is seen in the following decisions: *National Metre Co. vs. Yonkers*, 149 U. S. 48; *Weatherhead vs. Coupe*, 117 U. S. 322; *McClain vs. Ortmayer*, 141 U. S. 419; *White vs. Dunbar*, 119 U. S. 47; *Fay vs. Cordeman*, 109 U. S. 408; *Burns vs. Meyer*, 100 U. S. 671; *Keystone Bridge Co. vs. Phœnix Iron Co.*, 95 U. S. 274; *Merrill vs. Yeomanns*, 94 U. S. 568; *Bates vs. Coe*, 98 U. S. 31; *Sill vs. Wells*, 22 Wall. 1.

Proof as to the relationship of a patented invention to the art to which it appertains so as to enable the Court to judge whether the invention is one of a primary character or one only of a subordinate character is relevant and important as this Court has found, (see *Morley Machine Co. vs. Lancaster*, 129 U. S. 263–273; *Miller vs. Eagle Manufg. Co.*, 151 U. S. 186–207), in order to enable the Court to properly and justly apply the doctrine of equivalents in considering the claim and deciding the question of infringement. The doctrine of equivalents is one which can be stated with beautiful clearness and precision, and it certainly is so stated in the opinion of this Court in *Machine Co. vs. Murphy*, 97 U. S. 120, and in the scholarly review of this subject by Judge Putnam in *Reese Machine Co. vs. Globe Machine Co.*, 21 U. S. App. 244. The difficulty, as usual, lies in the application of the rule, and arises from the fact that from one point of view a device is properly to be considered as the mere equivalent for another device in a certain combination, while from another point of view, that of a later and more developed condition of the art, the sole difference between two inventions may lie in the difference of the same two devices. But, as we understand the rulings of this Court, the evidence as to the relationship of the patented invention to the art, is relevant only to the extent above noted, that is to say, for the purpose of enabling the Court to find whether a claim, *which is capable of a broad construction on the face of the patent*, and by considering references to special devices or steps as merely descriptive or illustrative and not limitations, is properly to be so construed, or whether the references in the claim to the specific devices or steps are to be considered as limitations on the scope of the invention, which invention if broadly construed, would be anticipated in the prior art. We do not understand that this Court has ever gone further in its rulings

as to the relevancy of evidence as to the relationship of a patented invention to the art, and we do understand that the Court has carefully guarded itself from being understood to hold that, under any conditions as to the importance of the invention, a feature or device which is clearly referred to as a limitation can ever be disregarded; certainly it has never held that any device, or step not referred to in the patent, can be, by construction or reference to evidence outside of the patent, incorporated in it. *McClain vs. Ortmeyer*, 141 U. S. 419.

Not only is it true that no patent can cover or protect an invention which is not fully disclosed in its specification, but it is also true that even where a claim is expressed with sufficient breadth to cover a certain invention, it is absolutely ineffective to protect that invention if the invention has not been specifically set forth in accordance with the requirement of the Statute. This would naturally follow from the provisions of §4888 R. S., but is also specifically mentioned as the first defense under §4920, providing that where the specification "is made to contain less than the whole truth relative to his invention or discovery," such defect vitiates it beyond remedy. The remedial sections of the Statute providing for disclaimers and re-issues, §4916 and 4917 expressly, except such a patent from the beneficial effects of these sections.

The Invention Described, Distinguished from Other Inventions, and Claimed in the Second Claim of the Patent.

Points 1-4.

The Jones invention is of a method of mixing molten pig iron to a substantially uniform composition with regard to non-metallic ingredients, and for the purpose of obtaining products from this mixed iron which will be practically homogeneous in composition, particularly in silicon and sulphur.

This is shown—

(*a*) By the clear and emphatic statement of the specification.

(*b*) By clear and unavoidable inference from other statements of the specification.

(*c*) By showing that the alleged difficulty in securing the specified object (uniformity), which difficulty the petitioner claims indicates a different intention, is based on an assumed mode of mixing with a dominating residue which is not specified and is contrary to the clear intention of the patentee.

(*d*) By the clear limitations of the claims.

(*e*) By the testimony of Mr. Carnegie.

(*f*) By the evidence of the Patent Office Proceedings.

(*g*) By an analysis, showing the fallacies, of the opinion of the Circuit Court judge to the contrary.

Clearly Stated in the Specification.

At the beginning of his specification (page 871 of the record) the patentee makes this absolutely clear, stating that:

"the primary object of my invention is to provide means (i. e. mixed pig metal) for rendering **the product** of steel works **uniform in chemical composition.**"

The specification then continues by pointing out and illustrating the defect of unmixed pig metal which, as the inventor states, contains unequally distributed admixtures of *silicon and sulphur* (referred to in the claim as non-metallic constituents). In consequence of this unequal distribution of silicon and sulphur the patentee says, (page 871, l. 38)

"the **product** of the refining process in the converters or otherwise *lacks uniformity* **in these elements** (*i. e.* sili-

con and sulphur) * * * *making it impossible to manufacture all the articles of a single order of homogeneous composition.*"

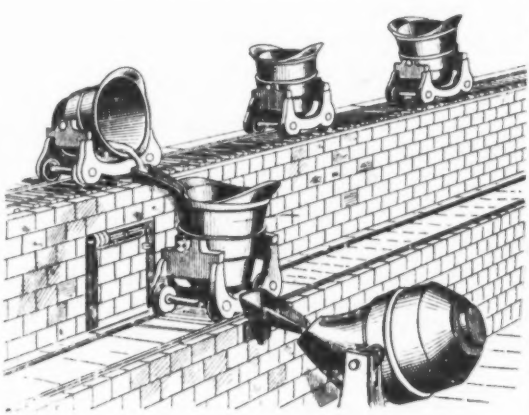
"*This,*" the patentee says, in the passage of his specification immediately following, is particularly true in the process of refining pig metal in converters, that is to say, Bessemerizing the iron.

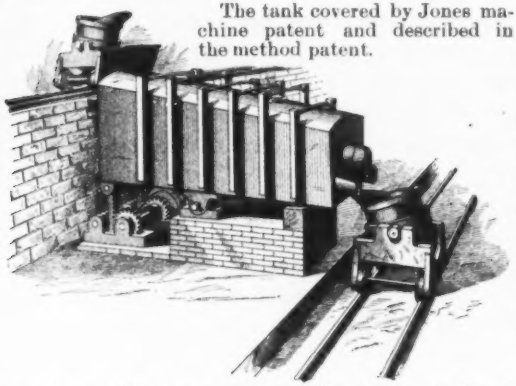
There is only one way to construe this. It is a clear statement, capable of no other interpretation, that *Bessemer steel made from ununiform pig iron is particularly liable to be ununiform in chemical composition* or, more specifically, is particularly liable to contain silicon and sulphur in uneven distribution.

Please note here that *the object* and *the sole object* in view (with primary reference to the composition of Bessemer steel, but as you will see further on, without limitation to the use to which the mixed iron is put) is to secure a **product** which shall be *uniform in chemical composition.* The evil which the patentee seeks to overcome is not any defect met with in **the process of refining or Bessemerizing the iron,** but solely a lack of uniformity in the proportion of silicon and sulphur present **in the refined product,** by reason of which ununiformity in **the product** articles made from the **product,** whether steel or otherwise, are not "*of a single order of homogeneous composition.*"

These are very plain matters very plainly, very simply, and very directly stated in the specification, but it seems necessary to state them with some emphasis, because they are absolutely ignored by the petitioner's witnesses and counsel, and because in the long and learned opinion of the Judge of the Circuit Court, there is not a single statement from which it could be even inferred that the pro-

JONES' PATENT.
MIXING IN A CHARGING LADLE





The tank covered by Jones machine patent and described in the method patent.

duction of iron or steel uniform in chemical composition, that is, with a uniform distribution of its contained silicon and sulphur, was an idea which had ever even crossed the patentee's mind, not to say the idea which he emphatically states to be the sole purpose and object of his invention.

The specification then continues by a general statement of the nature of the particular invention which the patentee has devised to attain this desired result of **uniformity in product;** (see first paragraph of page 872) which begins as follows:

> "For the purpose of avoiding *the practical evils above stated*, (and these evils are simply the production of a steel or other product un-uniform in contained sulphur and silicon; no other evil has even been suggested.) I use in the refining process a charge;"

going on to state thatthis charge is made up by mixing ununiform portions of the molten pig metal so as to average them up as to the contained silicon and sulphur, and produce a mixed charge of molten pig metal having *a uniform distribution of the silicon and sulphur*, the paragraph concluding—

> "By proceeding in this way not only is each charge for the refining furnace or converter homogeneous in itself, but, as it represents an average of a variety of ununiform constituent parts, **all** *the charges of the converter from time to time will be* **substantially uniform** *and* **the products of all** *will be homogeneous.*"

The second paragraph (p. 872, l. 21) reads:

> **"To this end** my invention may be practised with a variety of forms of apparatus." Instancing a charging ladle.

The rest of the paragraph has no particular relationship to the point now under consideration and we refer to it simply because in the passage quoted, as throughout the whole specification, there is reference to the previously stated purpose—"*To this end*", means

to the end of obtaining **a uniform product,** it cannot mean anything else, a product homogenous in its contained silicon and sulphur.

The third paragraph (p. 872, l. 33,) has a very distinct bearing on the question of the purpose and nature of the invention, and reads as follows:

> "My invention is not limited to its use in connection with converters, since *similar advantages may be obtained* by casting the metal from the mixing vessel into pigs for use in converters, puddling furnaces; or for any other uses to which pig iron may be put in the art."

"*Similar advantages!*" The advantages stated are *solely* those resulting from a uniform and homogenous distribution of the silicon and sulphur. These advantages arising from uniformity in the character of the product are obviously obtained from the use of the homogeneous pig metal, entirely irrespective of the nature of such a use. The Bessemer steel made from the homogeneous metal will be homogeneous. The wrought iron obtained by treating the homogeneous pig metal in puddling furnaces will be of uniform composition. The steel obtained by treating the homogeneous pig iron in open hearth furnaces will be of uniform composition. Pigs suitable for remelting, or cast metal articles prepared directly from the mixed metal will have the same advantage in their homogeneous distribution of silicon and sulphur. This is all obviously true. But what is not true is that the advantage alleged by the petitioner's counsel and witnesses to exist in the use of pig metal having a gradually varying admixture of silicon in and for the process of Bessemerizing would not be obtained in any other use to which the mixed metal could be put.

The advantage which the defendant is alleged to have availed itself of is not the production of a steel of uniform composition; on the contrary, it is clearly shown, and not disputed, that its steel product varies very materially with regard to its admixed non-metallic constituents. Of these the sulphur is practically unaffected by the Bessemerizing treatment, and the silicon presumably exists in the steel in a proportion dependent upon its presence in the iron, but not in the same quantity, because, in the process of Bessemerizing, the silicon contained in the iron is largely burned out, furnishing, indeed, the greatest heat-producing element in the process.

Howe on Metallurgy, on page 63, gives a table of the silicon, sulphur and phosphorus contents of different steel rails, good and bad, the silicon in good rail running about .04%, though English rails are higher, between .08% and .14%. It was considered desirable in giving soundness in ingots and other castings, as stated by Howe, page 40.

It is claimed by the petitioner's counsel and witnesses (see note A,) that sudden variations in the percentage of silicon present in the iron are apt to result in disadvantageous irregularities in the process of Bessemerizing, irregularities which do not affect the character of the steel produced with regard to the admixed non-metallic constituents, but do embarrass the operatives because this operation is one which should be governed largely by the percentage of silicon present, and because sudden irregularities in the percentage of silicon necessitate considerable variations in the treatment of the iron, while if the variations in silicon are only gradual the necessary variations in the Bessemerizing operation can be more easily provided for, each charge treated furnishing a guide for the treatment of the next.

(Note A).

Gayley (A. 170, p. 541,) in contrasting the Jones method with a certain step in the prior art, says:

> "It is entirely different in principle from the Jones method in that it does not aim to secure continuity by keeping the changes in composition and temperature within easily controlled limits for the converting mill; it does not recognize the **principal of continuity or gradation at all, nor that such gradation could be made beneficial;** nor does it provide for **slowly occurring gradations** which extend into a continuous operation from the beginning to the end of the week."

Kennedy (p. 445) gives a long dissertation on the variations of blast furnace metal and its causes, and describes the method at numerous steps, and says its effect "is to prevent abrupt fluctuations in the chemical and physical characteristics of the successive portions drawn off from the mixer." And further (p. 446):

> "it is possible to have very wide variations in the composition of the blast furnace metal at successive tappings, and at the same time to have the successive charges for the Bessemer converter show **quite small and gradual changes of composition.** This will continue constantly from day to day, the **metal varying slowly and gradually** * * * thus enabling the man operating the converters to regulate their operations with very great nicety, etc."

On cross examination (p. 471, A. 99) he says it is not so necessary that "the metal shall be always the same, as that it shall **vary slowly and regularly between successive charges.** Metal can be used

Now this alleged advantage of a gradually varying percentage of silicon in the iron is not claimed by anybody to exist in any other method of treating the iron than its treatment in Bessemer converters, hence when the patentee states, as he does in the last quoted passage, that *similar advantages* to those which he alleges to be obtained in the Bessemerizing process by his method are also obtained in the puddling process and in other treatments to which the iron is subjected in the art, he makes it absolutely clear that the advantage in view is not that alleged by the petitioner and which is peculiar to Bessemerizing, but is that which he has himself clearly stated, to-wit, the production of a uniform product, whether of steel or otherwise, which product can only be obtained by the use of pig metal in which the silicon and sulphur is averaged up to a substantially uniform standard percentage.

We desire Your Honors to note very particularly the fact that the **specification, in all instances where silicon is referred to, couples with it sulphur,** because this coupling of the two elements, properly understood, excludes the possibility of the inventor having in view an improvement in the Bessemerizing of the iron as distinguished from an improvement in the uniform quality of the product, whether of Bessemer steel or otherwise. This is so because, while the silicon plays an important part in the Bessemerizing operation and is largely burned up and eliminated by this

> in the converter having all the way from 1 per cent. to 2½ per cent. of **silicon** without serious trouble, providing the change is **made gradually, so as to allow the blower and scrapper to work intelligently."**
>
> Fry was asked (p. 518) X-Q. 168:
>
> "Then the Jones mixer, as you saw it used at Edgar Thomson, did not give entirely uniform results?
>
> A. Not at all, nor did the inventor, as I understand him, comprehend such, but on the contrary, he recognized the practical impossibility of rendering uniform a continuous supply of metal, and desired only to reduce the abrupt changes of the several portions added to the gradual changes of the portions withdrawn, and this is what he worked out from his invention in a thoroughly practical way."
>
> Metcalf states (A. 14, p. 622) his understanding of the Jones invention is that the steps are followed
>
> "to produce **not a uniform mixture** of iron to take out of that vessel, but a mixture of iron which **changes so slowly in its composition** as compared with the sudden and violent change in the blast furnace, that he practically eliminates the difficulty by using direct metal, gives to his blowers a metal which they can handle and manage successfully from day to day."

operation, the sulphur, on the other hand, is not in the least affected by Bessemerizing, nor does it affect this operation beneficially or otherwise. Obviously, then, if Mr. Jones had had in view only the Bessemerizing operation, he **would have referred to silicon alone,** but, having in view not the operation of Bessemerizing, but the product of that or any other treatment of the pig metal, he would naturally refer, as he does, to both silicon and sulphur, because both of them would greatly modify the character of the product if they exist in it in ununiform percentages.

The Reference to the Residue in the Patent.

The specification up to the point last noted describes as the patentee's method the simple mixing of iron to a standard composition irrespective of whether a residue of mixed iron is used as an element of the mixture or not, and the first claim of the patent is of similar breadth, not requiring the use of a residue in the process of mixing, while the second claim, that alleged to be infringed, does embody this additional limitation, the first reference to which is contained in the last paragraph beginning on page 872, which paragraph begins the description of the apparatus which Jones employed in carrying his process into effect and which apparatus, so far as it is new with him, forms the subject matter of his patent No. 404,415, printed page 876 etc., of the Record.

In the paragraph in question Mr. Jones describes, as a suitable mixing receptacle a rectangular covered tank adapted to receive and hold the molten metal and provided with a spout from which the metal is poured, and which, as shown, is located at some distance above the bottom of the tank and as to which the patentee says:

> "the purpose of which is that when the metal is poured out of the spout a considerable quantity may always be left remaining and unpoured and that whenever the vessel is replenished there may already be contained in it a body of molten metal with which the fresh addition may mix. **I thus secure as much as possible, uniformity** in the character of the metal which is fed to and discharged from the tank *and* cause the fluctuation in quality of the successive tappings to be very gradual."

The words used in the general description of the treatment with regard to the product of the mixing operation are "*practically* homogeneous," (line 12, page 872) and "*substantially* uniform,"(line 19, page 872). The purpose of the manipulation described in the

passage quoted from and by means of which some considerable quantity of mixed metal is left in the receiver to form a constituent of each new charge when it is "replenished" is stated to be to "*secure*, **as much as possible,** *uniformity*." Is it not clear then that this manipulation in which the residue forms an element of each charge, is stated as a measure directed toward the end sought, namely,—substantial uniformity, and not a measure directed toward ununiformity. This interpretation of the patentee's meaning is, we think, the only possible good English meaning of the expression used, and it is, moreover, consistent with the obvious nature and effect of the described manipulation because manifestly the presence in the receiver of a considerable body of iron having already the desired standard composition must infallibly tend toward and not away from the attainment of the result desired, namely, a product of substantially uniform standard composition.

This same feature of the construction of the tank is again referred to in a later part of the specification, (line 20, page 874,) where the inventor again notes that the effect of having a residue of the average mixed character left in the reservoir when it is recharged is that "each new charge mixes with parts of previous charges remaining in the vessel, by which means any sudden variations in the quality of the metal supplied to the convertor is avoided." A statement which is perfectly consistent with the declared object of the mixing treatment, namely, the production of substantial and practical uniformity and homogeneity in the chemical composition of the iron and of the steel or other product made from the iron.

The impracticability of securing uniform metal in operating the mixer as a reservoir does not qualify the declared purpose of treatment, because Jones clearly intended to use his mixer otherwise, viz: by successively charging and discharging it.

As the petitioner company now uses its intermediate reservoir and as the defendant uses its reservoir all the metal produced in the blast furnace which is at all fit for Bessemerizing, is dumped into the reservoir as it is produced and drawn from the reservoir as it is is wanted in the converter. The so called mixer is simply a huge intermediate reservoir employed to hold the metal produced by the furnaces and deliver it to the converters as they require it, exactly as the city water reservoir is interposed between the pumps

and the city mains and, like the water reservoir, it is generally kept pretty well filled up. This mode of use is, the petitioner's expert witnesses tell us, (*Fry, Q.* 27, p. 496; *Metcalf, Q.* 14, p, 622; *Gayley*, p. 569), and tell us truly, incompatible with the production of metal mixed to an approximately standard composition, but the petitioner's experts go further and assume that this mode of using the intermediate receptacle was that described and contemplated by Jones, (see Note A, p. 29), and from this they argue that Jones could not have meant to state that his process was one for producing metal which was "practically homogeneous" and "substantially uniform," and this position is accepted and adopted in the opinion of the Judge of the Circuit Court.

There is unquestionably an incompatability between the production of uniform metal by a mixing operation in a receiver and the use of such a receiver as a place into which all the metal produced is dumped without selection and from which the metal is drawn for use when required. If Mr. Jones had directed or suggested such a use, it would be inconsistent with his declared purpose and his patent would be incoherent and we think fatally defective because his described method would not secure the declared object and result of his treatment. But, as a matter of fact, Mr. Jones never directed and never suggested such a mode of use as is the modern practice and as the petitioner's experts attribute to him, and so far from describing a hit or miss dumping of metal into the reservoir, Mr. Jones clearly has in mind and indicates an operation in which the metal is charged into the receiver until it is filled and then drawn from the receiver until only the contemplated residue is left in it, and this, calculated from the drawing of the patent, would be about one-third of the charge. (Morgan, p. 419.)

Having been emptied to this point the receiver is refilled; a mode of use which is perfectly compatible with the result of substantial uniformity stated, because it permits *selected* charges which, no matter how heterogeneous, will average up to the desired standard, to be charged into the receiver. Thus in his first statement as to the general nature of his invention, after pointing out that his mixing of charges in the receiver, produced a practically homogeneous metal therein, Mr. Jones continues by stating, (l. 15, p. 872).

"by proceeding in this way, *not only is each charge for the refining furnaces or converter homogeneous in itself*, **but as it represents an average of a variety of ununiform constituent parts, all the charges of the converter from time to time will be substantially uniform and the product of all will be homogeneous."**

Again, in the passage describing the position of the spout, the inventor says, (l. 6, p. 873), "when the metal is poured out of the spout a considerable quantity may always be left remaining and unpoured, and that *whenever the vessel is replenished*," etc. This would seem to clearly imply, not a mode of operation which keeps the vessel constantly full or nearly so, but one in which it is successively, first emptied until only the desired residue is left, and then replenished or filled up again. This meaning is also clearly marked in the passage (l. 40, p. 873), which reads as follows:

"*The charges of metal introduced at different times into the vessel*, though differing in quality mix together, and *when the vessel has received a sufficient charge*, its contents constitute a homogeneous molten mass whose quality may not be precisely the same as that of any one of its constituent charges, but represents the average quality of all the charges."

Immediately following this passage is the sentence (l. 45, p. 873), which reads as follows:

"If desired, the commingling of the contents may be aided by **agitation of the vessel on its trunnions,** so as to cause the stirring or shaking of its liquid contents."

That is to say, after charging the vessel you are to shake it up, just as you would shake a mixture of medicines in a bottle, so as to insure a thorough and even distribution of all the constituent parts of the mixture. This suggestion of Mr. Jones is compatible, and compatible only with the mode of use in which the mixture is alternately charged and discharged. There would be no occasion or opportunity for shaking up the receptacle in the mode of use in which it is kept full and the metal constantly poured in and poured out of it.

The indicated mode of use is even more clearly shown in the passage beginning with line 13 of page 874, in which the inventor says:

"*After the vessel is properly charged* the metal is drawn off into cars 15 from time to time as it is needed. * * * *The tilting of the vessel* **does not, however drain off all the**

contents thereof, a portion being prevented from escaping * * * *as the vessel is replenished from time to time.*"

It seems that the clear reading of Mr. Jones' specification, in the passages above quoted, is that the *replenishing of the receiver by a number of charges dumped into it* and the operation of delivering the mixed and standardized metal from the receiver to the converters or other places of use, are successive; and when the very eminently skilled experts for the petitioner tell us, as they do, that the continuous mode of using the receiver in which it receives the metal practically at the same time that it delivers the metal is **incompatable with substantial uniformity in the product** *and can at best only secure a gradual ununiformity, they give us the very best reason for believing our construction to be right*, because, beyond question, the object sought by Jones was uniformity, and a forced construction should not be put upon his specification which would *make it describe a process which cannot secure uniformity.*

The picture given by this part of the specification clearly points to the mixing of batches, by emptying the vessel down to the part retained by the elevated position of the spout, leaving about one-third, and then to fill it up. "After the vessel is properly charged" means after it has received "a sufficient charge" (1.42, p. 873), and the specification states that "the metal is drawn off from time to time as it is needed". This "tilting of the vessel" is apparently to continue until it is drawn well down, the limitation being that it "does not, however, *drain off all* of the "contents thereof, a portion being *prevented from escaping* "by reason of the elevated position of the spout 6". It is not until this point is reached that the specification states that "the vessel is replenished".

A "charge" means the quantity a receptacle is "intended to or fitted to bear or hold", examples being the charge of a puddling furnace, gun, etc. (Standard, Webster, Universal and Centu ry Dictionaries.)

To "replenish" means "To fill again, after having been diminished or emptied, to stock anew; hence to fill completely." (Webster. See also Standard, Universal and Century Dictionaries.)

If the vessel is to be "replenished" or filled up after being so partially drained, it would give the substantially uniform product called for by the patent, while the practice of feeding in fresh por-

tions of metal after each withdrawal would, as shown by petitioner's own proofs, give only the gradual variation converter charges.

That this was the understanding of the Patent Office is shown by the statement of the Commissioner's report referring to advance in the Industrial Arts (p. 868) as follows:

> "A process now commonly used in steel manufacture is that of patent No. 404,414, January 4, 1889, to Jones, in which he described a means of getting a **uniform product** of metal by *mixing together in a suitable receptacle* **batches** of metal from different furnaces, so that the mixture when drawn off will be the average of the different charges."

The only argument which can be urged against the reasons above stated is the obvious inconvenience in working with a single receptacle and with very large quantities of metal by the method of alternately charging and discharging the mixer. Such a mode of working would preclude the possibility of storing the metal in any true sense, and would, therefore, no doubt disarrange the working of the plant as a whole; but this argument is based on the assumption which Your Honors will find to be a totally unjustifiable one, that Mr. Jones was in fact an inventor of a high order, and must therefore, his patent notwithstanding, be assumed to have had in mind all the exigencies of modern use. Moreover, the specification of the patent shows that Mr. Jones had provided himself with means for obviating to very large extent the difficulties which will arise from alternately charging and discharging a single receiver, for he says, (l. 31, p. 874):

> "I find it in practice more advantageous to employ two or more mixing vessels."

Obviously with two, or more than two, mixers and by the simple expedient of charging one mixer during the period of discharge of another mixer, all of the difficulties incident to a lack of storage would be obviated and the plant permitted to run consecutively, both in its producing and using departments.

The question as to whether or not the residue referred to in the second claim of the Jones patent is a preponderating residue forms the subject matter of a separate point of our brief, and is discussed further on under an appropriate heading. We have unavoidably been compelled to consider it at some length in this part of our brief, as for the reasons stated it has a direct bearing on the question as to whether or not the Jones process is one for obtain-

ing a substantially uniform product or whether it is, as petitioner contends, a mere process for avoiding the rapid consecutive fluctuations in silicon, without regard to uniformity of product, and solely as a guide to the conversion of the metal into steel.

The Claims are Limited to Mixing to a Uniform Standard.

Coming now to the claims of the patent, we will, to avoid a break in the continuity of the argument, ask you first to consider the bearing of the language used in the second claim on the question as to whether the patentee indicates as the proper way to use his reservoir the method by which metal is run into and out of it continuously so as to keep it always nearly full, or the method in which it is successively filled and emptied to a point where only a determined residual amount remains in it. The claim is, we think, very clear on this point and is entirely consistent with the specification as we understand it.

In the first place the reference to the operation of delivering the mixed metal from the reservoir for use is in the following words:

> "*Removing* **portions** *only of the composite molten contents of the receptacle* **without entirely draining or emptying the same.**"

This language is absolutely inconsistent with the position taken by the petitioner's counsel and witnesses to the effect that the process is one which necessarily involved keeping the reservoir substantially full of metal. Even if it were true that the specification contained a suggestion or even a recommendation to the effect that the reservoir should be kept substantially full it would be entirely clear from the use of the quoted language in the claim, that such a mode of use was not a limitation which the patentee was willing to have imposed upon his invention; but in the absence of even such a suggestion in the claim, the implication of the language used is clearly that the charged receptacle should be emptied down to the residuum provided for by the construction of the apparatus before the next successive operation of recharging it was performed.

Passing now to the main question under discussion, namely, whether the Jones patented process was one for securing uniformity in the composition of the metal or was one simply for prevent-

ing sudden variations in the composition of successive small portions drawn from the reservoir, without attaining substantial uniformity, your Honors will see that the claims are, on this question, just as clear and emphatic as the specification; thus the first claim refers to the method sought to be covered as:

> "*the process of* **equalizing** *the chemical composition of the crude metal*"

and the result of the process is referred to in the claim as "*the mixed and* **equalized** *charge.*" It does not seem to us that such language leaves any room for discussion. If the claim employing these expressions can be construed to cover a process which does not substantially "*equalize*" the metal treated in "chemical composition" then, we submit, it must be conceded that the English language is incapable of expressing a claim in which equalization is the purpose and result sought and obtained.

The second claim is just as emphatic and just as clearly in accord with the specification as the first. It reads:

> "*in the art of mixing of molten metal* **to secure uniformity** *of the same in its constituent parts.*"

Here again, as with respect to the first claim, we see no room for argument. The statement of the purpose and result to be obtained is absolutely clear and emphatic; indeed the reference to the purpose of equalizing the chemical composition of the metal is even more clearly expressed than in the first claim because **the art** of mixing to secure "uniformity" in chemical composition is referred to in the second claim as a separate art to which the special method covered by the claim belongs.

In the foregoing review of the specification and claims of the patent we have sought to confine ourselves as closely as possible to the special point stated at the head of this portion of our brief, only considering other disputed points of construction where they had a necessary bearing upon the proposition that the specified and claimed process was one, *the sole purpose of which* was to provide a means for securing **substantially uniform and homogeneous pig metal** to the end that **the products** made from such metal should also be substantially uniform and homogeneous in their contained **silicon and sulphur,** and we have made it clear, we believe, that on the face of the patent alone, what Jones describes and claims is solely such a process as will obtain substantial uniformity both in

pig metal and its products, and that it is impossible to hold this patent to cover a process from which neither the pig iron nor the products of such iron is uniform in its chemical composition but in which some other advantage is obtained by mixing the metal;—the said alleged advantage being one as to which the patent is absolutely silent;—one which can be obtained without improvement in the matter of uniform chemical composition;—and one which, instead of being common to all the arts specified by Captain Jones as those to which his process is applicable, is peculiar to only one of them.

In short, our proposition at this point is that even if it were satisfactorily shown that Captain Jones intended to cover such a process as the defendant uses, and that his patent was defective only because mishandled by his attorneys, and even if this invention which he intended to patent was one of pre-eminent importance and striking novelty; it would still be impossible, without absalute disregard of the statutory provisions with regard to patents, to construe this paper as one indicating or suggesting, not to say covering and protecting, a process in which equality in chemical composition was not sought or attained and in which the advantages secured as alleged by the petitioners' witnesses are absolutely not mentioned as either desirable or attained by the described treatment.

But evidence of the most unimpeachable character establishes in this case that Jones' invention was precisely what we contend it to be and precisely what we submit the patent expresses it as being. This evidence is, first, the testimony of Mr. Andrew Carnegie, the head of the petitioner firm; second, File Wrapper and Contents of the Jones application.

The Testimony of Mr. Carnegie as to the True Nature of the Invention.

Mr. Carnegie's deposition is printed on pages 428 et. seq. of the Record and you will find on looking at it that his relations with Jones were of the closest and most intimate description and, for this reason, and also because he was the head of the firm where Jones' process was introduced, he is the man of all men living who should best know the design and purpose of Mr. Jones' invention.

Mr. Carnegie begins his answer to Q. 5, pages 428 and 429, by a statement of the defects met with in the manufacture of Bessemer

steel at his works prior to the introduction of Captain Jones' invention and then passes, in the second paragraph of his answer, to a statement of the nature and conditions of the Jones method *as described to him by Jones and applied by Jones in practice.*

> "Capt. Jones, our superintendent, a most ingenious man told us that he believed he had invented a plan which would solve the problem. He explained to me his idea, which I saw at once to one be based on the system of averages. **He explained how he would take the charge of six blast furnaces, placing each into small portions; he could detect in each of these portions the excessive sulphur, for instance, or he could tell whether one furnace was yielding suitable metal or not. He would then have perhaps twenty or thirty carloads of portions of the output of six different blast furnaces; and he could even select from these small cars at the mixer he proposed to erect, if necessary, such portions as would neutralize each other, thus giving him a system of averages.** We thought so well of the idea—I was so convinced of its reasonableness—that I directed him to go ahead with his invention. He did so. My recollection is that the estimated cost was quite a large sum—the books will show this, but I think it was, mixer $48,000 and tracks $15,000. Capt. Jones did so; and almost from that day our troubles ended. He had scored a tremendous success;"

Further on, referring to a certain publication in the prior art, wherein the mixing of the pig metal is referred to as a means for avoiding defects met with in Bessemerizing, Mr. Carnegie says in answer to Q. 15, page 431:

> "The great point is not touched upon here at all. *It fails to grasp the soul of the invention*—**the law of averages; the dealing with successive small portions of metal which can be selected either at the blast furnaces or at the mixer."**

Again on his cross-examination on being asked whether the metal produced in the furnaces was dumped into the mixer just as it happened to come, he says, see answer to Q. 26, page 433:

> "A. Certainly not. As I understand the operations certainly not. If everything is running well and the metal is all suitable, I suppose he would do this; but **the great point,** *is that the Jones invention gives the superintendents the means of controlling this, whether they will or will not send forward metal which may be at that time unsuitable for combining with*

the product of the other furnaces. As I have said, it gives them an opportunity to avail themselves of the law of averages."

Mr. Carnegie further illustrates and amplifies his understanding of the Jones process, namely, *that it is a process for mixing selected batches of metal which will average up to a standard composition*, in his answers to × Q's. 28 and 32, and he restates his position with great clearness at the end of his re-direct examination, (R.-D. Q 71, page 443,) as follows:

"let me clear up on this point, All depends upon the average quality of the metal that was in the mixer, and the amount of metal. It is easily conceivable that the metal in the mixer might be irregular, or that the metal from the blast furnace put in might be irregular. **It all depends upon whether a mixture takes place of such suitable metal as in combination will produce the standard quality.**

Your Honors cannot fail to be struck with the perfect consistency of Mr. Carnegie's testimony as a contemporary interested observer, and as one having a right to have, and receiving from Jones, a full disclosure of his conception of the invention, with the specification of the patent and the limitation of the claim. The invention which Jones described to Mr. Carnegie, and which Mr. Carnegie introduced in his works was a process of mixing **"selected"** batches of metal to a **"standard quality."** The conception and execution of the process involved, as Mr. Carnegie describes, the presence of a large number. Mr. Carnegie states twenty or thirty car loads of molten metal, the composition of which was substantially known. It involved, moreover, the selection from among these car loads of those which would average up to the standard composition, and the dumping of these selected car loads into the mixer to secure this standard quality of mixed iron, and Your Honors will observe that this process of selection and averaging up of selected charges is incompatible with the operation of the mixer as a reservoir, kept filled by the dumping into it of charges as the withdrawels left room for fresh metal.

The File Wrapper and Contents, shows that Limitations to Uniformity of Composition Was the Sine Qua Non of the Grant of the Patent.

The Patent Office proceedings in the matter of the Jones patent are printed in the Record, pages 720 to 732.

We do not consider that, in a case where the meaning and scope of a patent specification and claim are as clear as they seem to us to be in the present case, it would be competent to vary such clearly and well expressed meaning by reference to the Patent Office proceedings. But, on the other hand, it is both competent and useful to refer to these papers in confirmation of the clear expressions of the document itself and for the purpose of showing that the limitations found in the patent were carefully considered, and were in fact required by the Commissioner of Patents as a condition of the grant.

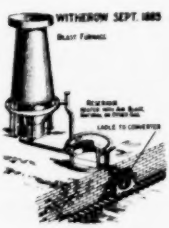
The specifications and claim, as originally filed, are printed (pp. 720–725.) A comparison of this paper with the revised and amplified specification of the issued patent will show you that the original paper, like the revised one, dwells with great emphasis upon the purpose of equalizing the composition of the metal to the end of securing a *product* from the metal which will be homogenous in *its* composition; but the original paper states, and states with emphasis, as a function of the invention, the **storing or reservoiring** of the melted pig iron, and the original claim is for a method of **storing and equalizing** the pig metal.

The vessel in which the process is to be carried on is called, in the original specification, a **"reservoir,"** (line 17, p. 721), and at the end of the original draft, the feature of reservoiring or storing the metal is stated with much emphasis as a part of the process, thus (p. 724):

> "The main feature of my present invention is the method of **storing** successive charges of molten metal in a receptacle before using it in converters or otherwise, etc."

and the original claim (p. 725) is for the described process of **"storing** charges of molten metal, etc."

This original application for a method of **storing and mixing** molten metal was flatly rejected by the Patent Office, see letter, (p. 725-726), as anticipated by the patents to Witherow Nos. 315, 587 and 327, 425, printed in the Record (pp. 941 to 944) and by



the passage cited from the publication entitled "Kirk's Founding of Metals" printed in the Record (p. 822). The particular matter referred to by the Patent Office being that printed at the end of the extract on p. 825. The Witherow patents both describe and show the use of intermediate reservoirs situated between the blast furnace and the Bessemer converters, their function being that of reservoirs to receive the metalfrom the furnace when the furnace is ready to deliver it and to deliver the metal to the converters when they are ready to receive it. The Kirk publication describes the use of a large reservoir arranged to receive all the metal melted in a cupola furnace and from which the metal is drawn for use in making castings the publication noting value of this use of the reservoir as a means for enabling different brands of iron to mix and average up in composition and specifically recommending the maintenance in the reservoir of a residual mass of molten iron with which the further charges mix and average up.

In consequence of the citation by the Patent Office of these patents and publications Mr. Jones' attorney withdrew the original, claim and filed as a substitue for it the claim printed on page 726, which differs from the original claim essentially in **the omission of all reference to the storage of the metal,** and the assertion of, as the sole function of the treatment, *the equalizing* of the composition of the pig iron drawn from the receptacle in charges.

In connection with this revised claim the attorneys filed the argument (pp. 725 and 726) in which they point out with reference to the amended and limited claim, which is purely for the equalization of the metal, that the Witherow patents express as the sole function of the intermediate reservoir, the *storage* of the metal without any regard to mixing, while, with general reference to storing operations such as both Witherow and Kirk describe, (although Kirk calls attention to the value of the receptacle in mixing metals), they press upon the Patent Office the fact that the purpose of Jones is to obtain **"a uniform average quality of metal"** and *this result*, they say, with reference to such operations as

Witherow and Kirk describe "*has hitherto been found to be practically unattainable.*"

The essence of the argument is that such mixing as occurs as an incident to the storage of metal will not result *in a uniform average quality of metal*" a uniformity which the attorneys allege Jones secures and to have been unattainable by any merely storing process.

The argument comes down to the proposition that proof of the storing of molten metal with incidental mixing does not anticipate Jones invention because such incidental mixing does not and would not be to an approximately uniform standard, the sole object and result of Jones' mixing.

In view of this argument the Witherow patents were withdrawn but the Examiner again rejected the application on reference to the Kirk publication and some additional publications found in British patents, (page 727), and in consequence of this second adverse action of the Patent Office the amendments in the specification and claims were made as shown by the attorney's letter (pages 728-30) and by means of which the application papers were brought to the form of the issued patent.

This *final amendment* erased the passages enclosed between rules on pages 721 and 724; it also erased the amended claim inserted by the first amendment and in place of the erased matter the new matter and new claims shown by the last letter of amendment (P. 728-30) were inserted. No written argument was filed in connection with this amendment and the next action of the Patent Office was the allowance of the case.

Presumably a personal interview was had between Jones attorneys and the Patent Office Examiner in connection with the last amendment in which it was made clear to the Examiner that the amended case avoided anticipation by the Kirk publication in view of which the case was so materially altered. It is to be regretted that the Record does not contain a clear statement by the attorney as to the features in which the amendment distinguished the application from the Kirk publication, but there is no difficulty in tracing in the amendment the exact nature of the distinctions made by the attorney and accepted by the Examiner.

Referring to the text of the amendment you will find that the following changes were made by it in the original paper.

First. **It removed from the specification all passages which referred to the storing or reservoiring of the metal.**

Second. The matter added by the amendment restates in language more clear and more distinct than that used in the original application, the fact that by Jones' method of mixing a product of **a uniform composition** was secured.

Third. The new matter added by the amendment states with great particularity and clearness and, for the first time, that the result sought was uniformity and homogeneity in product with especial reference to the admixed **silicon and sulphur.**

The fourth material addition to the specification is the clause describing the process as being capable of being carried on, not only in a large receptacle, such as the patent shows, but even in the comparatively very **small charging ladle** (which *holds but little over the amount charged into a converter*), and in which the metal can be mixed to the desired uniform composition as the specification sets out by pouring into it metal from several other ladles or receiving vessels.

There is no difficulty in following the distinctions made by counsel in this amendment as against the Kirk use, they are precisely those presented in the argumentative letter filed with the first amendment and *the force of the amendment is simply to bring the application into a form in which it would express a method of mixing* **to a uniform composition** *as distinguished from a method in which the metal was* **stored in a reservoir with only incidental mixing.**

The fact was asserted in the attorney's letter that in storing molten metal as previously practiced by Kirk and Witherow uniformity of product was not obtainable. The amendment of the case removed all reference to the storage of the metal and concentrated the statement and claim of invention on the mixing to a standard composition which the revision of the specification shows was accepted by both the Patent Office and the applicant's representative as inconsistent with the use of the vessel in which the mixing took place as a storage reservoir.

A pregnant fact with regard to the nature of the distinction made between the original subject matter of the application as filed, which was for a process of storing and mixing, and the subject matter of the finally amended specification, which is for a process of mixing to a uniform composition without storing, is found in the

fact that Captain Jones and his counsel recognized that the distinction between the original and final drafts was so great that the original affidavit made by Jones would not apply to the amended description and **Captain Jones therefore executed a new affidavit** (p. 730) in which he swears that he is the inventor of the invention as finally pointed out.

There was one other fact in connection with the Patent Office correspondence to which we desire to call Your Honors' attention, and that is, that nowhere in any of the papers filed in Washington was there ever a suggestion made to the effect that Captain Jones had devised a method which had any bearing or effect upon *the process of Bessemerizing iron*. Nowhere was it suggested at any time that any other advantage could be secured by Jones' invention than the production of *a uniform product*, whether it was a product consisting of Bessemer steel or of anything else which could be made from the eqalized iron; and it is also noticeable that in the argumentative letter of February 16 (pp. 726 and 727), reference is especially made, as in the specification itself, to the use of the mixed metal **for making castings,** as just as much within the invention as its use for Bessemer steel. We refer to this at this point in our brief because, as we have already made clear, we believe the fact has an important bearing on the construction of the patent with regard to the character of the mixing, because the benefit now alleged to have been in Jones' contemplation, to-wit: the improvement in the Bessemerizing operation, is one which does not exist with regard to castings or with regard to any process of refining the iron or making steel from it other than Bessemerizing.

The effect of such actions in the prosecution of the application upon the construction of the claim has been commented upon in the late case of *Hubbell v. The United States*, advance sheets Sup. Ct. Report, Nov. 15, 1900, showing that the claim as allowed in the patent must be read and interpreted with reference to the rejected claims and to the prior state of the art, and cannot be construed to cover either that which was rejected by the Patent Office or disclosed by the prior devises, citing *Leggett v. Avery*, 101 U. S. 256; *Shephard v. Carrigan*, 116,593; *Knapp v. Eorse*, 150 U. S., 227.

The late decisions of the lower court to the same effect, are, *Magic Light Co. v. Economy Co.*, 97 F. R., 87; *Irwin v. Hasselman*, 97 F. R., 904; *National Brake Beam Co. v. Interchangeable Co.*, 99 F. R. 758; *Campbell v. Duplex Co.*, 101 F. R. 282; *Reineke v. Dixon, Wood & Co.*, 102 F. R. 349; *N. Y. Asbestos Co. v. Ambler Co.*, 103 F. R. 316.

The Views of the Circuit Court as to the Limitation of the Patent to a Process of Mixing to Uniform Composition.

The construction put upon the patent in the Circuit Court of Appeals and with respect to the point under discussion coincides precisely with that for which we are now contending and is based on a consideration of the same facts which we have stated above in somewhat amplified form. (See pages 1118–24.)

The construction put upon the patent by the learned Judge of the Circuit Court was directly opposed to our contention and to the finding of the Circuit Court of Appeals, and his Honor arrived at his conclusion by a tremendously involved and complicated process of reasoning which can be traced by a careful reading of his very long opinion. (See pages 673–88.)

Source of the Circuit Court's Interpretation.

Instead of going to the patent for information as to what the invention was and what its objects and purposes were, his Honor depended for his impression as to the nature and purposes of the invention upon the testimony of the petitioner's witness, Gayley and the other expert witnesses who support him, all of whom described as the Jones method the manipulation now used by the plaintiff company and none of whom even pretend to have acquired information as to the nature of the process from the patent. Thus we have already shown to your Honors that the main witness, Gayley, when first examined as to the nature of the invention and the facts of infringment admitted at the beginning of his cross-examination that he had never even read the Jones patent, see ×-Q 35 page 36, and it appears that when Mr. Gayley was again put upon the stand as a witness in rebuttal, see his deposition pages 526 to 597, he was careful to preserve the same attitude of high aloofness with regard to the patent which, from the pleadings, would appear to be the basis of the suit, see page 556.

> "×-Q. 223. Is your testimony respecting the Jones process based on the language of the patent, or on the operations carried on at the Edgar Thomson works?

"My testimony in based on the operation of the process as I know and have practiced it.

"× Q. 224. Have you carefully read the Jones' patent in suit, No. 404,414, and compared the operations at the Edgar Thompson Works, of which you have testified, with the operations described in the patent, and particularly in the claims thereof?

A. During the period of my last examination, at the request of Mr. Kay, I read over the specifications of the Jones' patent. I believe that was a year ago. I do not recall that I have seen it since, *nor do I recall that in describing the operations of the Jones method I have had in mind, the character of the operations as described in the claims*, my object being to describe the method as I know it by practical manipulation of it."

We have also shown that Kennedy considered it "not as a patent specification" (p. 445); that Fry had only read the claims, as patent specifications "are rather dull reading," (p. 598) and that Metcalf had "only read the patent over casually" (p. 633).

Accepting the statements of Mr. Gayley and his colleagues as to the true nature of the invention the Judge of the Circuit Court did not attempt in any proper sense to construe the patent, but did bend all his energies to the effort to wrest and torture the plain English of the patent into, a meaning diametrically opposed to that which it bears on its face and which the evidence of the Patent Office file and of Mr. Carnegie himself, shows that it was intended to have.

Difficulties with Courts construction of Patent.

His Honor begins his opinion by stating that the difficulty which Jones sought to overcome was one incident to the process of making Bessemer steel and goes on to point out, at great length, the conditions affecting *this* operation, making it to appear that the great trouble at the time when Mr. Jones conceived his invention arose, not from any lack of uniformity in the percentages of silicon and sulphur, but were solely the natural difficulties incident to *abrupt variations in the percentage of silicon present*. This preliminary part of his Honor's opinion is the **key of all the rest,** but his statement to the effect that the described trouble in the Bessemerizing operation was the thing which Jones had in mind to obviate, is absolutely irreconcilable with the specification of the patent, because, as we have shown you—

1. The patent nowhere suggests that there was any difficulty with the Bessemerizing operation or that Jones had any intention affecting this operation in any way.

2. The sole object stated by Jones to be in his view was to secure products, whether of Bessemer steel or otherwise, which would be practically homogeneous and substantially uniform in their contained sulphur and silicon, results which could only be obtained by mixing the iron to a substantial *uniformity*.

If as a matter of fact Mr. Jones at the time he applied for his patent had in view, not only the process described by him for securing uniformity in the admixed silicon and sulphur, but also another process, similar to that now used by the plaintiff and defendant, and by means of which the operation of Bessemerizing iron was made, improved or facilitated without securing uniformity in the product, then, we submit, it is manifestly clear from his patent and from all the surrounding facts that he **deliberately and carefully suppressed any disclosure of this invention in his specification.** We say that this suppression was deliberate and careful, because if such an alternative process was in the inventor's mind it could only be by the greatest care that the description could be written, as it is, so as to afford no suggestion of the other mode of using the reservoir, and in saying that the suppression was deliberate we are imputing to Captain Jones and his counsel nothing discreditable but only what was wise and prudent, because

1. If they recognized that the use of the reservoir in such a way as to prevent abrupt variations in silicon without securing substantially homogeneous products was not a patentable invention, there was no reason why they should disclose this mode of use in their specification, for no attempt was made to claim it as an invention.

2. If they believed the method of use by which abrupt variations in silicon could be avoided without securing uniformity in product, to be a patentable invention, there was even more reason for carefully suppressing all suggestion of such a mode of use in the patent for the manipulation *to obtain uniform products*, because the two processes are obviously alternative and inconsistent with each other, incapable of being claimed in one application and therefore disclosure might have worked a loss of a possible grant of the patent for the alternative mode of use.

But if Mr. Gayley and the other experts who construe the patent without looking at it, and upon whom the judge of the Circuit Court depended for his conception of the invention are right in their assumption that the patent was sought or intended, to cover, not the unifying of metal products but the undescribed improvement in the operation of Bessemerizing, then the conclusion would necessarily be that the patent is void under Sec. 4920 of the Rev. Statutes *and because the essential conditions laid down in the prior* sections of the Patent Act were never complied with.

The Judge of Circuit Court, having lost sight of the statutory requirements as to a full, clear, and concise statement of the invention, and having persuaded himself that it was his judicial duty to find a way if possible to protect the Carnegie Company in his monopoly of what Mr. Gayley and his colleagues claim ought to have been the invention described in the patent, adopted the ingenious view that the patent was to be construed as though it disclosed and covered two inventions, one having for its object to obtain a product substantially uniform in its contained silicon and sulphur, and the other having for its object the improvement in the operation of Bessemerizing iron which is incident to an avoidance in the successive charges of abrupt variations in contained silicon, (see foot of page 685 and top of page 686). Following out this idea His Honor, rather by implication than by expression holds that the first claim of the patent, which has been withdrawn from issue, covers the process of obtaining a uniform product while the second claim of the patent has no relationship whatever to the obtaining of a uniform product, but does relate exclusively to the avoidance of abrupt variations—in the operation of Bessemerizing. To arrive at this conclusion His Honor is obliged, as we contend, to misconstrue the patent in many particulars which will be referred to hereafter under separate headings of the brief, in connection with our present point we simply submit three considerations which negative even the possibility of correctness in His Honor's position.

First, the construction which His Honor adopts of the two claims necessarily results in making the two claims for two separate, unconnected and inconsistent inventions; a patent having such claims is invalid and therefore such a construction is to be avoided if no construction which will save the patent is reasonably practicable.

Second, the construction of the second claim of the patent which would make it cover a process which has no relationship to uniformity in the admixture of silicon and sulphur, but is concerned solely with the prevention of abrupt variations in the percentage of silicon, is an impossible one under the terms of the claim which is expressly for a mixing to secure **uniformity in its constituent parts, sulphur, silicon, etc.**

Third, the sole basis to be found in the patent for the elaborate theory evolved by petitioner's experts and adopted by the Court, is the reference in the description of the apparatus suggested as best adapted for the practice of his process, to the effect that when his process is practiced in this apparatus the fluctuations in the quality of successive tappings from the intermediate vessel are gradual. From this statement His Honor concludes that where the process was practiced in the described manner in which the mixing receptacle was not entirely emptied before being refilled, the sole object was to avoid rapid consecutive fluctuations with entire disregard of the stated purpose to obtain a uniform product.

His Honor accepts the theory of Mr. Gayley and his colleagues that the Jones patent contemplated the use of a dominating residue and shows that the evidence establishing the fact that when so used, substantial uniformity in product can never be attained, a fact which should have led him to the rejection of the theory of the dominating residue, and from this basis he construed the second claim to be for a method not having for its object the obtaining of uniformity as it expressly reads, but, on the contrary, to be for a process of which non-uniformity in process was the essence. To quote from his Honor's opinion, (page 704):

> "*the question facing Jones was not how to reach uniformity but* **how to obtain a gradual non-abrupt, non-uniformity.**"

or as he puts it in another place, (line 12, page 707):

> **"his object was gradual, non-abrupt change."**

If His Honor is right in holding that the question facing Jones was "*not* how to reach uniformity, etc.," it is still clear that that was not the question which Jones faced when he came to patent his invention. There is absolutely nothing *in the patent* to justify the finding of the Court as to the purpose had in view.

Reference in Patent to Fluctuations.

The meaning of the patent where it refers to fluctuation is perfectly clear and perfectly consistent with the statement of the purpose of the invention, and with the limitation of both claims of the patent to such a mixing as produced uniform pig metal. It is obvious from a common sense standpoint that *absolute* uniformity in the composition of the metal is by the Jones or any other process adapted for practical use, out of the question. What Jones sought was, as he expresses it, "*practical*," "*substantial*" uniformity. It was obvious to him as a practical man that while each charge of his mixing vessel would be uniform, and while all the charges would be, in a broad sense and by careful attention to the ingredients, "*practically*" and "*substantially*" uniform, there would be some slight difference between the different charges of the mixer, and his recommendation of the manipulation in which a residue of the previously mixed charge is to be left in the mixer to form a component of its next charge is expressly and primarily as a means of securing greater uniformity. Thus, after describing it, he says, (line 9, page 375):

> "*I* **thus secure as much as possible** *uniformity in the character of the metal*"—

and, as we have pointed out before, Captain Jones was correct in his statement because the presence of the residue is a factor tending toward and not away from uniformity.

After having noted the function of the residue as a factor in increasing uniformity, the specification continues:

> "*and* causes the fluctuations in quality of the successive tappings to be very gradual."

Obviously the more nearly the successive charges of the mixer are made to the selected standard composition, the less will be the variation between successive tappings.

The residue is employed as a means **tending toward uniformity.** The statement as to fluctuations is not made as an alternative statement of the function of the residue. It is not "or," but "and." It does not mean, as the Court found, that gradual variation as distinguished from uniformity is the function, but that **the fluctuations are included in "as much as possible uniformity."**

This is the consistent, obvious meaning of the reference to variations in the tappings. This interpretation enables the second

claim to be construed in accordance with the plain English meaning of its expressions and not, as the Judge of the Circuit Court did construe it, by a direct inversion of its express assertion.

The opinion of the Judge of the Circuit Court is so long and so filled with what we believe to be errors, that it is impossible within reasonable length to review all the points on which the Court shows itself to be mistaken. In connection with the present point we will therefore call attention to only one other erroneous finding, namely, (top of page 702), where his Honor says:

> "In the Bessemer direct process you cannot secure, initially or by treatment, uniformity of molten metal; so far as yet developed *the best you can do to make the non-uniformity gradual and not abrupt.*"

The sole basis for this assertion by the Court is the fact stated by the experts, and as to which there is no disagreement, to the effect that, as carried on by the plaintiff and defendant, nothing even approaching substantial uniformity or homogeneity of product is secured, but there is not the least difficulty in obtaining the substantial homogeneity which Jones describes as the object and result of his process if you proceed as Jones directs and mix your non-uniform metals to a determined *standard composition.* Mr. Carnegie in the testimony we have quoted shows, that it can be done, and was done when the Jones process was introduced. It is moreover an obviously practical manipulation. The question, however, presented to the steel trade was whether the advantages of mixing to a standard composition, a method of procedure which necessarily excluded therefrom the mixing receptacle as a reservoir, *outweighed the advantages* of the use of the reservoir as such with only incidental mixing. **The trade has elected the method of using the receptacle as a reservoir, that is to say, it uses precisely what Mr. Jones disclaimed in the patent office as a condition of the grant of the patent.**

Before leaving the point under discussion we wish to note that from our point of view the question of infringement depends solely upon its determination; that is to say, we understand the Jones patent and its second claim to cover simply the method of mixing the molten pig iron to a standard composition in which each charge of the mixing vessel embodies as one of its constituent charges a residue of metal from previous charges already mixed to the standard composition. If we are mistaken in this, and if the claim is,

as the judge of the circuit court held it to be, for a method of mixing "to obtain a gradual, non-abrupt, *non-uniformity*," then, from our point of view, we do infringe the claims, and that utterly irrespective of the proportion of the residue employed by us, or whether we use direct or remelted metal, or of whether we use the mixed metal for making steel, or for any other purpose, and in this respect our position differs very widely from that assumed by the petitioner and adopted by the judge of the circuit court, for, while counsel for the petitioner seek to expand the claims of the patent in order to establish infringement, they seek also to impose numerous restrictions and limitations upon it for which we can find no justification, but which limitations are necessary even from the plaintiff's point of view, to avoid the conclusion that the claimed invention is fully anticipated.

We believe that on the point already discussed we are so clearly right that the case may be safely disposed of without requiring the examination of the other questions as to the construction of the patent, not to say the examination of the questions affecting the novelty of the process, but a close consideration of the other questions of construction greatly strengthens our position as to non-infringement, and is vitally necessary for a proper consideration of the questions of novelty.

The Dominant Pool.

The method covered by Claim 2, while it requires the employment of a residue of mixed metal from previous charges of the mixer as an ingredient of each charge of metal mixed, does not require nor does the patent suggest that this residue shall be dominating or preponderating.

This fact is, we believe, fully established, by the considerations to which we have already referred in discussing our first proposition as to the limitation of the patent to a method of mixing to a standard composition. We then directed attention to the point whether the patent indicated a mode of use of the mixer in which it was alternately charged and discharged or one in which the charging and discharging took place simultaneously, and it was necessary for us to consider this question in connection with the main question, namely, whether the patent indicated mixture to a substantially homogeneous composition or not, because, as we showed, it was only by the alternate charging and

discharging of the mixer that substantially homogeneous results could be obtained. Now, of course, as we believe ourselves to have shown, the patent clearly indicates a mode of use in which the mixer is alternately charged and discharged, it is practically obvious that no dominating residue is to be inferred, and therefore all that we have said and all the passages we have cited on pages 31 to 37 of our brief are directly applicable to the present question as to the quantity of the residue indicated by Mr. Jones;—and while we may touch on some of the passages before quoted we will in the further discussion of the present point consider the question as to the proportion of the residue independently of the closely allied question considered in the before mentioned part of the brief.

The invention as Mr. Gayley evolved it from his inner consciousness and by carefully avoiding even a reading of the Jones patent, and in which he was followed by the other experts, (see note B) was dependent upon the presence in the receiver at all times of a greatly preponderating mass of molten metal; that is to say, it is necessary in **Gayley's process to keep the receiver at all times practically full.** fresh metal from the blast furnaces being dumped into it as rapidly as room is afforded in the receptacle by the tapping off of charges. Used in this way the composition of the metal in the receiver will **vary between very wide limits,** but the difference made in the composition of the huge mass of stored metal by the addition of the comparatively small quantity dumped into it at one time will not be great and, as the consecutive charges for the converters are drawn from the receptacle in practical alternation

---

Note B.

In the opening case, p. 27, Gayley says:

"In the operation of the mixer the object is to keep together a large amount of metal, in order to insure a thorough mixture, and also to keep the mixers always full. * * * The advantages are derived from keeping together a large quantity of metal," etc.

Kennedy (p. 445) describes the invention as "pouring these small portions successively into a large receptacle, or mixing vessel, which is kept constantly full, or nearly full of metal," etc.

Fry says (p. 489): "The method comprehends accumulating and maintaining a relatively large body of molten blast furnace metal, to which relatively small portions are added from time to time," etc.

Metcalf says (p. 622): That "the advantage of slow, 'minute change' is accomplished by putting successive charges into a large pool of metal and withdrawing it from a different portion of the pool," etc.

with the dumping into the receptacle of the small charges from the furnaces the variations in the composition of the metal though wide are also gradual.

The fact that the variations in silicon and sulphur are gradual does not involve necessarily any improvement in the composition of the product made from the treated iron because the gradual variations may be just as great as the *normal variations* of the metal as it comes from the furnace. The fact that the admixed *sulphur varies gradually is not pretended to have any beneficial effect* from any point of view; but the fact that the admixed **silicon varies gradually,** while without influence on the character of the product, is **claimed to be of much importance in the guiding of the converter man in the operation of Bessemerizing.**

The testimony of Mr. Gayley and the other expert witnesses for the petitioner, is to the effect that this mode of working the intermediate receptacle by which it is kept always practically full, excludes the possibility of obtaining by the treatment, metal of a substantially uniform character, (p. 785; 946; 671, see also finding of Circuit Court, pp. 685, 686; 689; 692; 702; 704, etc.,) and it is unquestionably true that neither the petitioner nor respondent, in their present mode of work obtain substantially uniform metal. If petitioner's experts are right, then they have demonstrated that the Jones process, which we have already shown is unmistakably one for obtaining substantially uniform metal, cannot be practiced if the residue left in the receptacle is a preponderating residue, and therefore the conclusion to be drawn from their evidence should be that the Jones process is limited to the use of a residue of considerably less than half of the charge of the mixing receptacle.

For argumentative purposes, and so far as our client's interest is concerned, we could safely accept petitioner's expert evidence to the effect that the preponderating residue excludes uniformity, but it is our wish to present this case in its fairest and broadest aspect, and therefore we feel bound to admit that from our standpoint the use of a preponderating residue, while doubtless increasing the difficulty of obtaining a uniform product, does not exclude the possibility of securing such a product, because, **even where the residue is preponderating, it is obviously possible to hold the mixture at all times to a substantially standard composition by selecting each charge to be dumped into the mixer** so that its effect will be to change the character of the mixer charge in the direction of the

standard mixture desired. Very likely this is impracticable, but it is not impossible, and therefore we do not accept the position laid down for us by petitioner's experts, and do not assert that merely because the preponderating residue is used the Jones method is necessarily avoided.

Conceding then that the Jones method of obtaining substantially uniform metal might be practiced, though with difficulty, with a preponderating residue, the first and vitally important question to be considered under the present heading is whether Jones—

1. Describes or indicates in his specification the use of a preponderating or dominating residue.

2. Whether Jones in his claim limits himself to the use of such a dominating residue.

The Residue Described in the Patent.

These questions are very easily answered. The specification contains two direct references to the quantity of the residue and one inferential reference. The first mention of the residue is in the portion of the specification printed on lines 5 to 8 of page 873, the passage reading as follows:

> "– the purpose of which is that when the metal is poured out of the spout a *considerable quantity** may always be left remaining and unpoured, and that whenever the vessel is replenished there may always be contained in it a *body* of molten metal with which the fresh addition may mix."

The purpose being stated in the sentence immediately following as follows:

> "*I thus secure* **as much as possible** *uniformity in character of the metal, etc.*"

"*A considerable * quantity*" means simply *a not inconsiderable quantity*, "*a body* of molten metal" is certainly not an expression which indicates or implies anything more than "*a considerable quantity.*" It might appear that the expressions quoted were consistent with the use of a residue of any considerable quantity, even to the extent of a preponderating residue, but as the specification is addressed to those skilled in the art and as the purpose of the residue is stated to be to "secure as much as possible uniformity in character of the metal" and as the expert witnesses for

* Among the meanings of "Considerable" are "Worthy of being considered; worthy of regard; deserving notice; more than a little; not small." *Worcester.*

the plaintiff, who are gentlemen of the highest skill in the art, tell us that a preponderating residue is a factor inconsistent with the production of uniformity in the metal it would appear that the expressions used have, to those skilled in the art, a more restricted meaning than they would have to those without such skill and that the inference is clearly to be drawn that the residue is less than a preponderating quantity.

The only other direct reference to the matter of the proportion of the residue is that contained in the sentence beginning with line 19 of page 874, which reads as follows:

> "The tipping of the vessel *does not, however, drain off all the contents* thereof, *a portion* being prevented from escaping by reason of the elevated position of the spout itself, etc."

So far from indicating the maintenance of a preponderating residue the expression in the passage above quoted clearly implies that the **residue left in the vessel is a relatively small quantity** to the quantity poured from the vessel.

But the context of both passages quoted in this connection shows that the amount of residue which Mr. Jones contemplated was that provided for by the situation of his delivery spout in the apparatus shown in the drawings of his patent. It is clear that he intended the receptacle after charging to be emptied down to the line indicated by the position of this spout, and the defendant's witness Morgan, in his answer to R-d. Q. 166, page 419, estimates the residue from this basis to be "*about one-third*" of the full charge, an estimate which is not questioned by any of the petitioner's witnesses.

The Wording of the Second Claim as to Residue.

Passing to the second claim of the patent, you will not find in it anything to indicate the use of a residue of greater proportionate size than that indicated in the specification. On the contrary, you will find the patentee to carefully choose language with reference to the quantity of the residue which would exclude any idea of a restriction or limitation as to the proportionate quantity. The language of the claim with reference to the quantity left unpoured is as follows:

> "removing portions only of the composite molten contents of the receptacle *without entirely draining or emptying* the same."

It would seem from this language used with reference to the residue that Mr. Jones intended to cover the process of mixing to a uniform composition whenever any **residue from a former charge, no matter how small,** formed an ingredient of the recharged mixture. By reference to the specification a restriction may fairly be put on the language used in the claim by which it will be made to mean that an **appreciable residue** must be left, that is to say, a residue of **sufficient quantity to produce some effect** in the general averaging up of the contents of the recharged mixer, but this is clearly the furthest extent to which it is possible, by any reasonable construction, to restrict the broad language of the claim.

The finding of the Circuit Court of Appeals is a fair statement of the meaning of this part of the specification (p.1121).

> "The quantity which shall remain in the receptacle is stated to be 'a considerable quantity.' Beyond this **vague description** the specification of the patent is silent. **We find nothing in the patent which warrants us in determining that the patentee had in mind that the residue left in the receptacle should form a dominating pool.** The residue, composed of parts of previous charges, mixes with the new portions which are poured in, and thereby the molten metal becomes practically uniform in chemical composition."

To hold then that the second claim of this patent covers a method of mixing which *involves as a necessary feature* the maintenance in the receiver of a dominating or preponderating residue would be, in the first place, to impose upon the language of the claim a meaning absolutely inconsistent with that which, as a matter of plain simple English it obviously has,—and to do so,not because such an interpretation would make the claim consistent with the specification, and notwithstanding the fact that the specification, so far from indicating a dominating residue, clearly indicates one which is not dominating; but solely because Mr. Gayley, and the other experts who do not pretend to base any of their statements upon the patent, say that the "Jones process" as carried on in the Carnegie Works is carried on with a dominating residue.

You are asked moreover to impose this limitation to a dominating residue on the second claim,not because those skilled in the art tell you that such a residue is necessary to the attainment of the result which it was Jones' express purpose to secure, namely, the production of substantially uniform and homogeneous metal, and therefore was

to be implied because necessary to the end stated, but you are asked to impose this limitation in spite of the admitted fact that the dominating residue is inconsistent with the production of uniform metal and because petitioner's experts tell you that the "Jones proces" as carried on in the Carnegie Works does not secure or aim to secure uniformity in the metal but has another useful purpose which is neither mentioned nor suggested in the patent.

We very earnestly submit that to construe this patent as calling for and being limited upon the use of a dominating residue would be to ignore and nullify every provision of the Revised statues fixing the conditions of a valid patent grant.

Jones has never specified such an invention. (§4888)

Jones never claimed such an invention. (§4888)

Jones never made affidavit that he was the inventor of such an invention. (§4892)

The statutory search imposed upon the Patent Office was not and could not have been made with reference to such an invention. (§4903)

If Mr. Gayley had testified that the "Jones process" as carried on in the Carnegie works involved the admixture with each charge of the mixer of a dose of castor oil it would be just as permissible to construe the second claim of the patent to be limited on such a use of castor oil as it is to construe it as limited on the use of a dominating residue.

Errors of Circuit Court as to Dominance of Residue.

Turning now to the opinion of the Judge of the Circuit Court you will find in it that His Honor held the defendant to infringe Jones patent, not because it used an intermediate receptacle and maintained a residue therein, but solely because he found that the residue in the defendant's intermediate receptacle was one *preponderating and predominating quantity*, and you will find also that that the judge found no other invention whatever in the "Jones process" except that it provided and required the presence of a dominating residue. Thus, in the sentence beginning at the bottom of page 684, His Honor says, after an extensive review and long quotations, not from the patent, but from the testimony of the petitioners expert witnesses:

> "Simply stated, *Jones' idea was the creation and maintenance of* a great pool of metal between the blast furnace and

converter plants *through which all incoming and outgoing metal must pass.* * * * To replace the withdrawn converter charges fresh additions of blast furnace molten metal were *constantly* added."

And further down on page 685, see line 28, he continues:

"The heat of the detained mass is affected by the incoming charges just from the blast furnace, but the heat of such addition, whether relatively high or low, must mingle with, be modified by, and average with the heat of *the larger and dominating mass.*"

This is a very accurate summary of the testimony of Mr. Gayley and his colleagues with regard to an alleged "Jones invention" which they claim to be in use at the Carnegie works but, as we have shown, it is not based upon and is not consistent with the claims and description of the patented Jones invention, and when His Honor afterward says, as he does in the last paragraph of page 686:

"The specification then describes *the gist of the invention, viz: the process of using this homogeneous mixture as a controlling* **dominant** *pool.*"

He says what he does not substantiate in his quotations from the patent and what cannot be substantiated by any fair, consistent reading of the patent.

The Judge's opinion is full of the *dominating pool*, indeed it might be said to grow constantly more dominating until it becomes the whole thing, as example bears out, line 6, of page 696, where His Honor refers to

"*the Jones process* **of continuous maintenance of a dominating pool.**"

And at the end of the opinion the matter of infringement is placed as, we have noted, entirely on the dominance of the pool used, see sentence beginning line 1, page 712, where His Honor says:

"With such a permanent **dominant pool** in constant use we are clear that respondent's practice infringes the second claim of the Jones patent in both letter and spirit."

We have quoted from the opinion of the Circuit Court the passages most adverse to our interests because by comparing them with the patent specification and claim the amazing departure of the Court from the patented invention is most clearly evidenced and because these passages show how vital the judicial misconstruc-

tion of the patent was to the finding that the patent disclosed any invention or that there was any ground for holding the defendant to infringe it.

While petitioner's briefs in the Circuit and Appellate Courts have been crowded with quotations from witnesses as to the dominant pool, in the discussion of the patent itself practically no reference to the same has been made. They *assume that the patent describes it*, and when it is pointed out that there is no basis for the same, they claim it is a function of the Jones process, and that he is as much entitled to it as if it had been fully and correctly stated in the specification, citing well known authorities on the general point, that, even though a function is not described, the patentee is entitled to the benefit of it. The difficulty of the petitioner's treatment of the patent is that they **exclude the description** found in the patent as to the **object.** namely, "uniform product," and as to the *operation*, namely, mixing with any "considerable" residue, and that they *make the test both of invention and infringement the use* of the dominant pool, which is not described in the patent, and limit its function *only* to the production of gradual variation, so **re-writing to itself a new patent** never granted by the government. We have shown that the dominant pool is not suggested, and that the patent was deliberately drawn to exclude it, and we believe that the proper conclusion to be drawn from the same, if Jones intended his patent to cover such method, is that the patent is necessarily invalid under the provisions of section 4920 R. S., 1st paragraph, because

> "for the purpose of deceiving the public the description and "specification filed by the patentee in the Patent Office was "made to contain less than the whole truth relative to his in-"vention or discovery."

The furthest we understand the Court decisions to have gone is that where a function additional to those described in the patent has been discovered, the Court will consider the same *in connection with, but not exclusive of*, the other functions in support of patentability. Even in such cases, however, where the function is not described in the patent the presumption is against a construction which makes such function an important feature of the invention.

Where a like question was raised in the Circuit Court of Appeals for the 1st Circuit in *McCall vs. Knowles Loom Works*, 95

F. R., 982, the following comment and citation of the cases of this Court was made:

> "In the construction of a patent, the omission of the patentee to point out or refer in his specification or claim to the special feature which he subsequently maintains, as the most important part of his invention is very significant, and should be carefully scrutinized.
>
> "If this feature be an advantage, as now claimed, it is strange that no allusion is made to it in the specification. *Fastener Co. vs. Kraetzer*, 150 U. S., 111, 116.

Again, in *Edge-Setter Co. vs. Keith*, 139 U. S., 530, 539, the Court said:

> "If any separate function had been performed by this combination, it is somewhat singular that the patentee did not call attention to it in his original application, or until after the main feature of his patent was shown to have been anticipated."

In *McClain vs. Ortmayer*, 141 U. S., 419, 424, the Court held:

> "The object of the patent law in requiring the patentee to particularly 'point out and distinctly claim the part, improvement or combination, which he claims as his invention or discovery,' is not only to secure to him all to which he is entitled, but to appraise the public of what is still open to them. The claim is the measure of his right torelief."

In *Kurcheedt Co. vs. Naday*, 103 F. R., 948, it was held that the fact that neither the specification nor claim mentions a function which is later claimed as an important feature of the invention is a strong presumption against the construction contended for.

Use of the Mixed Metal.

The method covered by the second claim is a method of mixing pig metal irrespective of the use afterwards made of such metal, and is in no manner limited to the use of the metal for making Bessemer steel.

The above proposition seems so self-evident that it would need no argument to support it. But the Circuit Court, following petitioner's witnesses and the argument of its counsel, has held that the second claim of the patent is limited to Bessemerizing in the converter, (See p. 688.) It has so interpreted the words "preparatory to further treatment."

The Circuit Court of Appeals has, we believe, given the proper construction to the patent, saying, (p. 1118):

> "Neither can the object of the Jones invention be limited to the uniforming molten metal preparatory to its use in the Bessemer converter. The words of the claim and specification both forbid. In the claim the inventor says he has a process which in the art of mixing molten metal will secure uniformity of the same in its constituent parts preparatory to further treatment. These words are broad enough to include a puddling furnace, an open hearth or any treatment to which the molten metal is adapted in the art, and in which it is desirable to have uniformity in its constituent parts."

The patent itself is, of course, a source of information on this subject, and we think it and the proceedings prior to its grant, show clearly that no such limitation was intended.

The title given to the invention is a "method of mixing molten pig metal." This title was given when the application was filed, (p. 720) and was accepted by the Patent Office in its letters of allowance, (p. 731), an *opportunity for changing*, the same being given the applicant (*but not availed of*), at the foot of the circular letter of allowance, the following clause appearing:

> "The within title is given by the Examiner in charge as *most appropriate to your invention.* Should you desire a change in the same, satisfactory reasons must be given therefor on or before the payment of the final fee."

Your Honors know that no "method of mixing molten pig metal" will produce Bessemer steel, so that if this process is for a

method of making Bessemer steel it is clearly inconsistent with the title so deliberately fixed by the inventor and the Commissioner of Patents as that proper to designate the invention.

Passing to the specification (p. 835) the first statement is as follows: "*The primary* object of my invention is to provide means for rendering the *product of steel works* uniform in chemical composition." Two points in connection with this passage are to be considered, first, that in referring to the production of steel of uniform composition it is stated to be only "the primary object." **A "primary" object implies a secondary object,** therefore, even from this statement alone, it is to be understood that the process was intended to include more than the production of uniform steel product.

The primary object stated is to make uniform the product of *steel works in general.* Now steel is made by several different processes; it is made by the Bessemer process; it is made by the open hearth process; it is also made by the crucible process; therefore there is nothing in the passage quoted which would imply that the process had any exclusive relationship to the *Bessemer process* as distinguished from the other processes for making steel.

Reading down the paragraph from which the above quotation is made you find that the sole defect dwelt upon by the patentee is the uneven distribution of silicon and sulphur in the blast furnace metal in consequence of which, he says, (p. 871, line 39)

> "the *product* of the refining process *in the converters or otherwise* in like manner lacks uniformity in these elements."

The *converter* is a peculiar and indispensable requisite to the Bessemer process. In referring therefore to the refining of the metal "*in the converter or otherwise*" the patentee clearly includes such other steel processes, and you will see further on he has also in mind refining processes which do not make steel.

The inventor closes the paragraph stating the primary object of the invention as follows:

> "*especially* is this so in the process of refining crude iron taken from the smelting furnace and charged directly into the converter, etc."

If anything is required to make it clear that what has been said before refers in its least scope *to all other methods of making steel* this passage certainly does remove this question as a subject of

discussion, showing that everything previously stated had general reference to steel making processes of all kinds and hence that the "primary object" was to make uniform the character of steel however produced, the Bessemerizing process being instanced only as the particular steel making process in which ununiformity of product with regard to silicon and sulphur was most likely to occur.

The patentee states that he uses "*in the refining process*" the mixed and averaged metal, and further down in the paragraph states that each mixed charge "for the refining furnace or converter" is homogeneous, and that the product of the mixing will be homogeneous. These expressions are certainly broad enough to include any steel making process so that it is conclusively shown that the invention is not limited to Bessemerizing.

Mr. Gayley says (p. 566) referring to the mixed metal of the Jones patent:

> "It might be delivered to a converter or an open hearth furnace, or for any refining process."

Mr. Morgan says (p. 400):

> "The term 'refining process' includes use in converters, puddling furnaces, and open hearth furnaces, or any other refining process known in the art."

But the specification is a very successful paper in making its meaning clear and showing that there is the *secondary object* even outside of steel making (See p. 872, l. 33):

> **"My invention is not limited to its use in connection with converters, since similar advantages may be obtained by casting the metal from the mixing vessel into pigs for use in converters, puddling furnaces or for any other uses to which pig iron may be put in the art."**

This does not seem to require explanation or to leave much room for discussion. In the lower Court the counsel for the petitioner argued, if not with ingenuity, certainly with desperation, that "the art" referred to at the close of the quotation was the art of Bessemerizing iron, and that, in some way or other, we should read the passage as stating that while the invention was not limited to use in connection with converters it was limited to the Bessemerizing process. That this was nonsensical even to themselves was shown by their subsequent course of disclaiming the paragraph.

Further investigation of the specification shows that the same careful intent was evidenced throughout the same to exclude any

possible implication that the process was limited to the use of the mixed metal in the Bessemer process, examples of which need simply be given. When at line 17, p. 874, the patentee refers to transporting the metal "to the converters" he is careful to add "or the metal is *cast into pigs* or otherwise used." And at the end of that paragraph he refers to carrying the mixed metal in cars "to the converters or *casting house*," and again, "to delivering the metal to the converter" or "other place where it is to be utilized." A casting house would naturally include a foundry, fitting therefore in with the above quoted paragraph either for casting the metal into pigs or for other uses in the art, while the other term "other place where it is to be utilized" is the broadest possible term that could be used.

As contradicting the position that the patent is to be construed as covering solely the Bessemerizing of iron, it is also quite as important to know that the specification is absolutely silent with regard to any peculiar advantages obtainable from the process of Bessemerizing.

The sole purpose stated is to secure a product, whether of steel or otherwise, which would be uniform in its contained silicon and sulphur. There is no suggestion that a special advantage is obtainable by using mixed metal in which the silicon alone is either uniform in its percentage, or of gradually varying percentage, and as we have pointed out before, the only reference made in the specification to gradual variation is as a result expressly stated to be secondary to a described manipulation having for its primary purpose the attainment of uniformity in both silicon and sulphur to the highest possible degree.

The claims also make this matter clear. While the first claim is expressly limited to the step of subsequently "refining the mixed and equalized charge" (p. 875, line 1), the second claim contains no limitation as to the nature of the treatment to which the mixed and equalized iron is subjected, but is expressly for the securing of uniformity in the molten metal "*preparatory to further treatment*," no treatment being specified, while the process pointed out in the part of the claim following this reference is consistent with stopping the process with the attainment of the mixed pig metal uniform in silicon and sulphur.

In view of the specification the word "refining" in the first claim would certainly include the refining in a puddling furnace,

which does not make steel but makes wrought iron. If this be so it is also impossible to limit the second claim to a steel-making process where the language is still broader and includes any treatment suggested in the specification; *i. e.*, any use to which pig iron may be put in the art, specifically referring to use in puddling furnaces or casting houses, or casting the metal into pigs.

Light From the Patent Office Proceedings.

This is also made clear by the Patent Office proceedings, all the above broadening statements in the patent specification being present in the application as filed, while in the first amended claim (p. 726) it referred to removing the metal from the receptacle "for subsequent treatment," and in the argument in support of that amendment (p. 727) Mr. Bakewell refers to the use of the mixed metal "drawn for treatment in the converters or otherwise, as required," "this, * * * results in an average quality of metal, whether treated in the converters **or used for casting** without such treatment, *as is very desirable.*"

That there would be advantage in obtaining a standard average composition of molten pig metal for making castings, for use in puddling furnaces, or for other purposes, is a self-evident fact. In connection with the making of castings it is fully proven as to both car-wheel practice and general foundry practice, as hereafter shown. As to ordinary pig metal the difficulty has been with the sulphur product, where the difficulty has been to obtain uniformity of sulphur in the product, the variation of sulphur seriously affecting the ordinary wrought iron.

Molten Metal.

The patented method is not limited to the mixing of metal drawn directly from the blast furnace, but covers as well the mixing of remelted pig metal.

As the title of the patent is for "mixing molten pig metal", and the opening words of claim 1 are "In the art of mixing molten metal", the natural interpretation would be that the invention includes any molten pig metal, whether coming directly from the blast furnace or remelted. The Circuit Court of Appeals has held (p. 1118) that the claim includes molten pig metal either from blast furnace or cupola. Our apology for discussing the question is found in the fact that in the Circuit Court the claim was held only to cover "metal direct from the blast furnace".

It is believed that comparison of the claims should settle this question. Claim 1 is expressly limited to the mixing of the iron "directly from the smelting furnace", while claim 2, the one involved in this case, contains no limitation, but broadly relates to the treatment of "molten metal". It is to be presumed that the different language used in the two claims was intended to limit one and to give the other broad scope.

In discussing the difficulties of irregularity in the pig metal and the injurious effect upon the product, the specification says (foot of p. 871):

"*Especially* is this so in the process of refining crude iron "taken from the smelting furnace and charged directly into the "converter without remelting in a cupola." This clearly implies the existence of the evil, though in a less degree, in remelted metal and the advantage of the method as applied to that.

Jones has, however, settled this matter directly in the companion application for patent for the apparatus shown in this method (pp. 876). The two applications were sworn to and filed on the same day, and at the end of the apparatus application he stated generally the use of his vessel, saying (p. 737):

> "The main feature of the present invention is broadly a covered preliminary receiving vessel for holding and mixing the charges of **molten metal which are supplied thereto either from a blast furnace or cupola", etc.**

As to the literature of the art, we might also refer to the Deighton 1873 English patent (p. 984) which refers to the same art as petitioner claims for Jones, namely, the mixing of blast furnace metal to produce Bessemer steel, where he states near the bottom of the page, "I prefer to place the *cupolas* which supply "the converter with *molten metal* in a row", etc.

The true governing consideration should be, we think, whether Jones' mixing process would be the same method if applied to the metal when remelted in the cupolas. Unless the patentee by the force of an absolute limitation has cut himself off from a construction which would cover the use of his process with either direct or remelted metal, his patent must be construed to cover both. He has so cut himself off as to the first claim, and the fact that he has not as to the second claim would indicate that it should be construed to have the broader meaning.

The next controlling consideration is that the *cupola metal is irregular and for certain purposes requires the mixing operation* to give greater uniformity of product. We have shown this clearly in connection with the Whitney practice, hereafter fully discussed (pp. 162 to 179) where a very high degree of uniformity was obtained, and with the American-Bessemer Cupola Ladle practice (pp. 179 to 193) where a less degree of uniformity was obtained, but the Metal Cupola was by means of the vessel properly evened up to produce sufficient uniformity for Bessemerizing. As shown in connection with such prior uses 16 witnesses have proven the irregularity of the cupola metal and the matter is discussed in several publications.

In addition to this we have shown that the term "molten metal" naturally includes the cupola metal, and that the cupola metal is simply the direct metal which has been permitted to cool and has been remelted, its chemical condition not being changed. See Gayley, p. 52; Kennedy, As. 66-7, p. 465; Fry, A. 87, p. 505; Forsythe, A. 22, p. 265 Q. 31-33, p. 266; Wood, A. 12, 13, p. 161; Hunt, A. 20 to 25, p. 293.

Hunt states, A. 24, "they are both molten cast iron containing certain alloys or impurities such as carbon, silicon, phosphorus, sulphur, etc." Petitioner's witness Fry states (A. 87) that there would be practically the same variation in the pig metal that was in the molten metal. Mr. Morgan states that metallurgists understand the term to include both; and in answer to × Q. 81, p. 400, says that the two metals may be and often are identical.

While this is acknowledged by petitioners, their main reason for a different interpretation is fairly stated by Mr. Gayley in answer to × Q. 301, p. 372, " * * * in the second claim the "term 'molten metal' is used, which is comparatively a broad term, "but in **our method of operation at the Edgar Thomson works it "was not so in reality,"** etc. He claims that the term "molten metal" as used by them referred exclusively to metal taken direct from the blast furnaces. All patents, however, are to be interpreted by what they mean to those skilled in the art, and if petitioner's works have adopted for their *private use a sort of cryptogramic English* which means something different to the employees of those works to what it means to those skilled in the art, and if Jones applied this cypher to the description of his invention, he made the mistake of ignoring the requirement of the law to the effect that patent specifications shall be expressed in the English

language, and the *experts in the Carnegie cypher* certainly cannot force upon this Court an interpretation which is only possible by the use of a key, and is absolutely impossible by the use of the dictionary or by the custom of the trade.

The authorities in support of the proper broad meaning of the term "molted metal" are referred to at length hereafter in discussing the Whitney cupola practice. We refer to the same now with a simple brief statement.

In *Lovell Mfg. Co. vs. Cary*, 147 U. S., 623, this Court held that the method was the same, whether applied to tempering steel furniture springs or tempering clock springs.

In *Legett vs. Standard Oil Co.*, 149 U. S., 287, this Court held the method to be the same, whether applied to glue when first produced in molten state or applied to remelted glue.

In *U. S. Mitis Co. vs. Carnegie Steel Co.*, 89 F. R. 343, decided by Judge Acheson, subsequently argued before the Appeal Court, after which the present petitioners withdrew their appeal, so that the case stands as controlling, the Court held that the problem of making castings from wrought iron or steel is precisely the same, whether the steel is used and treated as it comes molten from the converters or whether the steel is remelted.

In *U. S. Repair and Guarranty Co. vs. Assyrian Asphalt Co.*, 96 U. S. 235, where a limiting meaning was attempted to be given to the word "asphalt," the Court gave it its proper interpretation to include all kinds of asphalt.

In *Falk Mfg. Co. vs. Missouri R. R. Co.*, 103 U. S., 295, in the Circuit Court of Appeals for the Eighth Circuit, the term "molten metal" was applied as covering remelted metal used for making cast metal joints.

Proper interpretation of the patent; Jones' own interpretation in his companion application; the consensus of witnesses and authorities, all indicate that the term "molten metal" should have a broad interpretation, including cupola metal.

Some Minor Errors in the Construction of the Patent in the Circuit Court.

Your Honors will find on reading the opinion of the Circuit Court Judge not only the mistakes in the construction of the patent above noted, but also certain other mistakes, of a minor character to be sure, but which had best be noted, as they relate to matters which appear to have been considered important by the Judge writing the opinion.

Small Portions Fed to the Mixer.

In the first place, the opinion indicates that the Judge in construing the patent, considered the process to be limited on a method of replenishing the mixer by means of charges of molten metal relatively very small to the mass of metal in the mixer, this is practically covered by our discussion of the Court's error in holding that a dominating pool was called for, but it is well to note, in addition, that there is **absolutely nothing in the patent** which imposes any **limit on the relative size of the charges** to be mixed together; no one could escape the infringement of the patent by using larger charges of molten metal, and if that is the case, the patent can derive no strength from the suggestion that the charges should be small, even if that suggestion were to be found in the patent which, as a matter of fact, it is not, except in a clause relating to the use of a small mixer, which petitioner attempted to erase by disclaimer.

Petitioner's witness Kennedy, (p. 646–8) makes clear that there are no such limitations.

Large Covered Mixing Vessel.

It would appear from the language used and reasoning embodied in the opinion of the Circuit Court that the Judge of that Court considered the patent to be limited upon the use of a mixing receptacle which was both of very large size and, as is the case with the mixer shown in the drawings of the patent provided with a cover.

It should be enough, we think, in reference to this matter, to point out that the invention is described and claimed as *a method* and that, therefore, the mere character of the receptacle in which the method is carried out must necessarily be immaterial, that is to say, if the so-called method was a mere function of the machine the

claim could not be sustained as a method claim, but, as a matter of fact, the patentee is most careful to prevent any possible implication that the character of his mixing receptacle was in any way important; thus he says in the paragraph beginning line 21, page 872:

> "My invention may be practiced with a variety of forms of apparatus—for example, by merely receiving in a **charging ladle** a number of small portions of metal taken from several ladles or receiving vessels containing crude metal, etc."

Now the charging ladle is a **small ladle** and it is a receptacle which is **open at the top,** therefore, manifestly unless this passage is to be read by a rule of reversal of obvious meaning, a rule which would seem to be the key of the Carnegie cryptogram, the patent cannot be construed to be limited on the size of the receptacle or the presence or absence of a cover.

The passage from which we have quoted above, that relating to the use of the charging ladle, seems to have been one which embarrassed the petitioner's counsel because in the so-called disclaimer which they filed they have undertaken to get rid of it by disclaiming it. Why they should seek to do this we really do not understand because while the passage explains the patentee's intent with great clearness, it does not and could not affect the scope of the claim from the mere reason that the claim is to a method and therefore *ipso facto* could not be dependent on the matter of the size of the receptacle or as to whether it had or had not a cover.

The use of a covered reservoir was old and well known however, as the Whitney ladle was covered at one time, but it was found unnecessary (p. 121). See Hainsworth patent p. 934. Witherow patent (p. 944). Stewarts Cupola (p. 850. Drawing old record p. 1405). Gayley admits it was an obvious and well drawn expedient (p. 563). The Jones application originally claimed a covered vessel (p. 725) but this limitation was removed in the claim as issued (p. 730).

Conclusion as to the Construction of the Patent.

We have in the foregoing part of our brief considered each of the disputed questions as to the proper meaning and construction of the patent as far as possible, separately and apart from the others, because each question is an independent issue and because each of them has a vitally important bearing either upon the question of infringement or the question of the novelty of the invention,—or, perhaps, it would be more correct to say in the latter case, that the bearing is not so much upon the novelty of the invention as upon the pertinency of certain specific prior uses—for we do not consider that even with all questions of construction decided as they were decided in the Circuit Court, any substantial novelty existed in the so-called Jones invention in view of the general state of the art.

The method in which we have deemed it best to present these questions of construction, while it has greatly expanded our brief will, we believe, be found best adapted to the convenience of the court because, if Your Honors find it necessary to go into an examination of the bearing of the specific uses and publications proved upon the invention, you will be able to refer for our views on the particular question of construction involved in each case, to a special segregated portion of the brief.

In the science of astronomy there is a famous theory known by the name of the Nebular Hypothesis. With a slight change this name will fit the construction contended for by the petitioner's expert witnesses and counsel. It is a nebulous hypothesis. In the opinion of the Judge of the Circuit Court, however, it assumed a more or less definite form and it is instructive to the last degree to compare the definition of the Jones invention as evolved from the whirling star dust of the petitioner's presentation of the case by the Circuit Court judge with the statutory claim of invention appended to the Jones patent and this can readily be done by drawing a claim which will express in plain English words what the Court said was the patented invention and comparing it with the written claim of the patent.

Or it can be even better done by revising the claim of the patent so as to make it express in plain English what the Court found to be the Jones invention. Thus in the following example the words of the original claim are printed in black ink, a red erasure line

being drawn through those words which are eliminated in the Court's construction while the additional matter necessary to made the claim express what the Court attributes to it is printed in red ink.

A comparison of the claim as issued by the Patent Office and as construed by the Court can best be made by the expedient of drawing a claim to cover what the Court states in its opinion is covered by the claim and we have thought it most convenient to take the original claim and amplify or alter it to embody the Court's construction in the following example: the words of the original claim are printed in black, a red erasure line being drawn through those words which are eliminated in the Court's construction and the additional matter supplied by the Court being printed in red ink.

In the art of mixing molten metal to secure ~~uniformity~~ of the same in its constituent parts ~~preparatory to further treatment~~ the process of introducing into a mixing receptacle successive portions of molten metal non-uniform in their non-metallic constituents (sulphur silicon, ~~etc.~~) removing portions only of the composite molten contents of the receptacle ~~without entirely draining or emptying the same~~ successively replenishing the receptacle with fresh ununiform additions ~~substantially as and for the purposes described~~.

Claim 2 of Jones Patent.

"In the art of mixing molten metal to secure uniformity of the same in its constituent parts preparatory to further treatment, the process of introducing into a mixing receptacle successive portions of molten metal ununiform in their non-metalic constituents (sulphur, silicon, etc.), removing portions only of the composite molten contents of the receptacle, etc., without entirely draining or emptying the same, and successively replenishing the receptacle with fresh ununiform additions, substantially as and for the purposes described."

Claim 2 as Construed by Court.

In the art of mixing molten metal direct from the blast furnace (687) to secure gradual non-abrupt non-uniformity (704) of the same in its constituent parts, so that one charge is a guide to the blowing of the next (688) and producing steel therefrom by Bessemerizing in the converter (687), the process of introducing from carrying ladles (692) into a covered tilting (692) mixing receptacle relatively small successive portions (684) of molten metal direct from the blast furnace (687) non-uniform in their non-metalic constituents (sulphur silicon, etc.) until a great pool (684) of metal sufficient to form a dominating mass (684) is created, removing portions only of the receptacle while still maintaining, preponderating and dominating pool of metal (684, 674), the successive portions so withdrawn being not uniform but gradually varying (685, 686, 687, 689, 692, 701, 704, etc.), successively replenishing the receptacle with fresh ununiform additions of metal direct from the blast furnace (687) in relatively small portions (584) and without permitting the metal to solidify, Bessemerizing the gradually various portions withdrawn in a converter (687).

Thus since the case of *Goodyear D. V. Co., vs. Davis* 102 U. S. 222 there has been no question in this Court but that "a patent, like any other instrument, is to be interpreted upon its own terms" (227), and that the patentee is bound by his claim and the Courts will not narrow it to save the patent, where the meaning of the claim is clear. If this is so it certainly follows that the Court will not transpose the patent into a different art from that to which it purports to relate and will not upon evidence extraneous to the patent find that the purpose of the invention was different from that stated, and that a claim for mixing molten pig iron in a way to pro-

duce a uniform homogenous product is to be interpreted as though it were a claim for a manipulation in the process of Bessemerizing iron with which uniformity in product has nothing whatever to do. *Railroad Co. vs. Mellon*, 104 U. S., 112; *Mfg. Co. vs. Greenleaf*, 117 U. S., 554; *White vs. Dunbar* 119 U. S., 47.

THE DISCLAIMER.

The disclaimer is ineffective to change the meaning and scope of the Patent as issued.

The disclaimer in this case printed on page 672, was filed after argument in the Circuit Court, was admitted in evidence and passed upon by the Circuit Judge (p. 712) as being a valid and effective disclaimer, without discussion except as to unreasonable neglect or delay in filing the same.

The Circuit Court of Appeals held that it was not a valid disclaimer, saying (ps. 1118-19):

> "It does not seem to us that the complainants limit the claim of the patent in suit by the disclaimers which they have filed. In our opinion they do not modify or change the construction of the claim as originally granted. They do not disclaim anything. Their avowed purpose is 'to limit the scope of the letters patent to the mixing of molten metal preparatory to further treatment.' This we find to be the limit of the patent as originally granted. **The disclaimers therefore do not comply with the statutory requirement** that the patentee shall give up some material or substantial part of the thing patented of which he was not the original inventor. It we examine the eliminated parts of the specification we find that they relate, 1 to an example of a way in which the mixture of the molten metal may be made, and which is only one of the obvious varieties of form in which the invention may be practised, and, 2, the uses to which the mixed metal may be put in the art after the patented process has been completed. Neither of the matters erased affects the process or method of mixing molten pig metal, which was the subject-matter of the patent, nor do they affect anything of which Jones claimed to be the original and first inventor. They do not, therefore, come within the limits laid down by the Supreme Court in *Cartridge Co. vs. Cartrige Co.*, 112 U. S., 624, where, speaking by Mr. Justice Blatchford, they say, **'The statute expressly limits a disclaimer to a rejection of something before claimed as new."**

It is important to note that the disclaimer makes no attempt to limit the method to the mixing of any particular metal. The term "molten metal" remains unchanged and the patent therefore includes cupola metal within its scope for the reasons we have before stated.

Another point of importance is that the first claim is not disclaimed, though it is obviously invalid in view of many uses, patents and publications, and known by the petitioner so to be, as it was withdrawn from consideration on March 30th, 1897, early in petitioner's rebuttal case (p. 459). It might well be urged that their unreasonable neglect and delay in entering the disclaimer of this claim so *recognized as invalid* three years ago and almost a year before the entry of the disclaimer actually filed rendered the whole patent invalid under the provisions of §4922 R. S.

No Disclaimer of "A Thing."

Respondent urges three points in connection with this:

First. The statute requires that there must be disclaimer of "a thing."

Second. The statute does not authorize the disclaimer of mere words without disclaiming a thing.

Third. A defective and insufficient specification can only be corrected by reissue.

The most noticeable feature of this paper purporting to be a disclaimer is that it does not in fact disclaim A THING.

The first paragraph, by way of recital, states that

"*the specification of said letters patent is too broad, including more than the invention of the patentee, &c.*

The next paragraph begins with the assertion of what is intended to be effected by the disclaimer, the petitioner alleging its intention

"to limit the scope of said letters patent to the mixing of molten metal *preparatory to its further treatment.*"

To consider this expression of intention with reference to the second claim you find that the limitation so-called is precisely that which in identical words is expressed in the second claim, therefore if the disclaimer is effectual for any purpose it is certainly not effectual to limit the second claim.

Following this expression of intention the disclaimer continues to assert that the petitioner

"hereby enters this disclaimer to those parts of the specification which are in the following words which your petitioner desires to erase from said specification."

"On line 83 to line 91 of the first page of the said specification (page 872, lines 21 to 25 of this record) the words,

"for example, by merely receiving in a charging ladle a number of small portions of metal taken from several ladles or receiving vessels containing crude metal obtained at different times, or from different furnaces, the mixing being performed merely by the act of pouring into the charging ladle, and other like means may be employed."

"On page 1, the 100th, 101st and 102nd lines, and lines 1, 2. 3 and 4, on page 2, (page 872, lines 32 to 36 of this record) as follows:

"My invention is not limited to its use in connection with converters, since similar advantages may be obtained by casting the metal from the mixing vessel into pigs, for use in converters, puddling furnaces, or for any other uses to which pig iron may be put in the art."

"On page 2, lines 127. 128 (page 874, line 19 of this record) the words

"or the metal is cast into pigs or otherwise used."

In short, this so-called disclaimer expresses with admirable candor its sole purpose to be to **erase certain words** from the specification and does not point out any subject matter which has been **previously claimed and which it was desired to disclaim.**

Assuming that a disclaimer can do what this so-called disclaimer purports to do you are left to inference and construction to ascertain what the effect of the erasures should be upon the construction of the patent, and, when you come to examine the nature of the attempted erasures, you find but little suggestion as to the true purpose had in view by the petitioner.

Why the petitioner wished to erase the matter of the first passage we have never been able to ascertain. It is an absolutely harmless passage, stating as a fact what is unquestionably also a conclusion of law, namely, that the Jones' process can be carried on with the aid of, among other receptacles, an ordinary charging ladle. Of course it can. We cannot conceive that the patent could receive any different construction whether this passage was embodied in, or omitted from, the specification.

Affect Upon the Words "Further Treatment."

The purpose in view in the erasure of the second and third passages to which the disclaimer relates appears to have been, primarily, to remove from the specification expressions which clearly show that in using the words "*further treatment*" in the claim, Mr. Jones had in view, and intended to express, not only the use of his uniform metal in making steel, but its use in the puddling furnace for making wrought iron, and its use for making castings. The only reasons to doubt that this was the intention are, in the first place, the failure to erase from the specification the reference to the disposition of the metal in the "*casting house*" as an alternative to its use in converters, which occurs in lines 27 and 28, page 874, and the further reference to the disposition of the mixed metal "*in other places*" as an alternative to its use "in the converters" which occurs in lines 29 and 30 of page 874. With these passages left in the specification it would be difficult to restrict the meaning intended by the patentee in the use of the phrase "further treatment" to any less comprehensive variety of uses than that to be inferred from the unmutilated specification.

But even supposing that the mutilated specification were further mutilated so that no direct assertion could be found in it that the patentee contemplated the use of his mixed metal for castings or for other purposes than refining into steel, the meaning of the words "further treatment" in the claim could still not be plausibly argued to refer to Bessemerizing *only*, because, as we have shown you, the specification in its remaining parts makes it absolutely clear that the "further treatment" comprehended any and all methods of making steel, to the sole end that *the product* of all such methods should be *substantially homogeneous and uniform in composition.* To briefly note the pertinent passages. The object, stated (p. 871) relates to "the *product of steel works.*" Near the bottom of the same page the words used are "*the product of the refining process in converters or otherwise.* "The reference (l. 6, p. 872) is generally to the use "*in the refining process;*" (l. 16, p. 872) the expression is "*the refining furnace or converter;*" (l. 29, p. 874) "*to the converters or other places where it is to be utilized;*" (l. 27, p. 875) "*subsequently refining.*"

It is absurd, in view of the above passages to contend that the words "further treatment" in the second claim are intended to, or do, in fact, limit the use of the metal to Bessemerizing, yet if this

limitation is not effected the whole theory of petitioner's case falls, because, as the advantage which they claim to have been had in view by Jones is solely applicable to Bessemerizing, it would leave them without the least basis for their claim that the mixing was to be carried on, not as Jones directs, so as to produce substantially homogeneous metal, but as Jones never suggested, to wit; so as to prevent sudden variations in silicon without reference to the character of the metal product.

In brief then, our position is:

First. That if the so-called disclaimer is effective to make the erasures, the second claim must still be construed as applying to the process by which uniform metal is secured, irrespective of what further use is made of it, and

Second. That the second claim would still have to be construed as covering only such mixture as resulted in substantial uniformity of product and, especially so in view of the Patent Office proceedings, as carefully differentiated from and practically disclaiming a method of mixture in which uniformity of product is not obtained.

Before leaving the subject as to the effect upon the construction of the patent which would be produced were the erasures proposed effective, we desire to submit the point that the "*further treatment*" referred to in the second claim is by no possible construction, a part of the process covered by the claim. On the contrary by the clearest possible selection of words the claim is limited to a process for the treatment of molten metal preparatory to further treatment, that is to say, **ending before the iron is subjected to any further treatment.** The force of the words used is exactly the same as though, instead of predicating the enumeration of the steps constituting the process with the assertion that they are preparatory to further treatment, the patentee had added to his enumeration of these steps the phrase—without further treatment, Either expression excludes further treatment of any kind from the scope of the claim.

Apparently the line of thought followed by the petitioner's counsel is that because Bessemerizing is stated to be *one of the further treatments* to which the homogeneous metal may be put with advantage, it is therefore competent to limit the scope of the claim by including in it the specific further treatment of Bessemerizing. But you will see, if this can be done, it was clearly just

as competent. at the election of the assignee of the patent, to make this—instead of a patent for Bessemerizing—a patent for making steel in open-hearth-furnaces, or—a patent for making steel in crucible furnaces, or—a patent for making wrought iron in puddling furnaces or—a patent strictly limited to making castings from the homogeneous iron, and by a further study of the specification in which you see that the real result sought, was, as the specification states (foot of p. 871) "to manufacture all *the articles* of a single order of homogeneous composition." You will be brought to the inevitable conclusion that it was just as competent for the Carnegie Steel Co., by a so-called process of disclaimer to make this second claim cover—a process of making needles, or—a process of making car wheels, as it was to make it cover a process of making Bessemer steel.

What the petitioner has undertaken to do by disclaimer is, *in kind*, similar to the attempt made by the patentee in the case considered by this Court in *Grant vs. Walter*, 148 U. S. 547, though with infinitely less basis in the specification of the original patent than existed in that case, because, in the case formerly before this Court, the further treatment, that is the "dying," to which it was sought, by the expedient of a disclaimer, to confine the original subject matter of the patent, was the only further treatment contemplated by the patentee, while in the present case the further treatment referred to in the second claim was *intended by the patentee* to refer not only to all of the specific and *various treatments* mentioned in the specification but to any other treatment or use *to which the iron could be put in the art.*

The above reasons are those which lead us to the conclusion, which we submit to be the correct one, that even if the erasures sought to be made by the so-called disclaimer were made, the construction of the second claim would still necessarily be precisely that which was originally intended by the patentee and expressed in his unmutilated specification. Our further contention is that,—

The so-called disclaimer filed is not a legal disclaimer because it does not purport to do any thing which by law disclaimers are effective to accomplish.

The Statutory Law as to Disclaimers.

Two sections of the Revised Statutes relate to disclaimers, one giving authority for the filing of such papers and the other relating to their use in suits brought under defective patents.

The provision of the first section (4917) is that:

> "Whenever through inadvertence, accident, or mistake, and without any fraudulent or deceptive intent, a patentee has claimed more than that of which he was the original or first inventor or discoverer, his patent shall be valid for all that part which is truly and justly his own, *providing the same is a material or substantial part of the thing patented;* and any such patentee, his heirs, or assigns, * * * may make disclaimer of such parts of the **thing patented** as he shall not choose to claim or to hold by virture of the patent." * * *

The other section, 4922, provides, with the same preliminary language excluding from the benefit of the statute cases where the defect in the patent occurred through the fraud or intent to deceive, provides that when

> "a patentee has, in his specification, claimed to be the original and first inventor or discoverer of any material or substantial part *of the thing patented*, of which he was not the original and first inventor or discoverer, every such patentee * * * * may maintain a suit at law or in equity, for infringement of *any part thereof* which was *bona fide* his his own, **if** *it is a material and substantial part* **of the thing patented,** *and definitely distinguishable from the parts claimed without right* * * * But in every such case in which a judgment or decree shall be rendered for the plaintiff no costs shall be recoverable unless the proper disclaimer has been entered at the Patent Office before the commencement of the suit * * * ."

Now for a definition of what the above statutes mean in reference to the **"thing patented"** we must look to Secs. 4888, 4892 and 4893, from which we find that the thing patented is, the *thing* described and distinguished from other inventions in the specification;— the *thing* "particularly pointed out and distinctly claimed", the *thing*, to which the patentee made affidavit and—the *thing*

ascertained in the above manner, which the Commissioner of Patents has made the subject matter of his search as to novelty and which, after such search, he has approved as a patentable invention. *Nothing* as to which these conditions have not been complied with cannot be under the law *the thing patented.*

A brief glance at the development of the patent statutes is highly instructive as to the true nature of the remedy provided for and permitted by Congress in the present sections of the Statutes relating to Disclaimers.

From the very first we find that Congress had had clearly in view the protection of the public against ill-defined, nebulous claims; thus, in the Act of 1790, Sec. 2, first Statutes at Large, the duty is imposed on the patentee of so specifying and describing his invention as to distinguish it "from other things before known and used" and in Sec. 6 of the same Statute, it is provided, as a defense to the whole patent, that in case "the specification filed by the plaintiff does not contain the whole of the truth concerning his invention and discovery" the verdict and judgment should be entered for the defendant.

In the Patent Act of 1793, Section 3, this same duty as to distinguishing the invention is imposed on the patentee with the additional obligation of an affidavit that he is in fact the true inventor of the thing which he seeks to patent, and in Section 6 of this Act it is provided that any variation from or concealment of "the whole truth" with respect to the invention shall make the patent void.

While in the Acts above noted no provision was made for the correction of defective patents it appears that the Secretary of State, to whom the issue of patents was then committed, assumed the power to receive the surrender of a defective patent and grant a reissue of the patent, a course which was approved by this Court in *Grant vs. Raymond* 6 Peters 218, decided in 1832, immediately following which decision was passed the Act of July 3d, 1832, providing statutory authority for the grant of reissues and fixing the conditions under which they should be granted.

In the Patent Act of 1836 Congress re-enacted the provisions of the former Acts imposing on the inventor the duty of distinguishing his patented nvention from other inventions—and of making affidavit to the fact of invention,—and, for the first time, provided, as an additional safeguard, that the Commissioner of Patents,

should make examination as to the novelty of the inventions sought to be covered and to refuse the grant of a patent where novelty was not apparent. In this Act also the conditions under which a reissue might be granted were fixed substantially as they exist in the present controlling statute.

It cannot be doubted that in the Acts above mentioned the existence of any material defect, insufficiency, or claim of novelty to what was in fact not new, rendered the patent granted under them invalid and void and that the only remedy in such cases was under the section providing for the reissue of the patents.

In the year 1837 a supplemental act was passed which, in its 7th section, provided, for the first time, another method besides that of a reissue for avoiding the invalidation of a patent in which a patentee had through inadvertence, accident or mistake—

> "made his specification or claim too broad, claiming more than that of which he was the original and first inventor" and in which patent "some material or substantial part *of the thing patented* being truly and justly his own."

In such a case it was provided that the owner of a patent

> "might make disclaimer of such parts *of the thing patented* as the disclaimant shall not claim to hold by virtue of the patent."

In the 9th section of the same amendatory act it is further provided that under the conditions pointed out in section 7 as being those under which a disclaimer was appropriate, the patent—

> "Shall be deemed good and valid for so much of the invention and discovery as shall be truly and *bona fide* his (the inventor's) own; provided it shall be a material and substantial part of *the thing patented* and be definitely distinguishable from the other parts so claimed without right as aforesaid."

The provisions as to re-issue and disclaimer were re-enacted in the Patent Act of 1870, and in the Revised Statutes without material modification or variation in the parts above quoted, and from an examination of the existing Acts as well as from an examination of the legislation tracing its purpose and intent, it is clear—

1. That no invention can be covered by a patent which is not one described, claimed and distinguished from other inventions by the patentee, in his specification. (Sec. 4888.)

2. That no invention can be covered by a patent as to which the inventor has not made oath that it is his invention. (Sec, 4892.)
3. That no invention can be covered by a patent which is not for a thing which, by the terms of the specification, the Commissioner is directed to examine for novelty and utility. (Sec.4903.)
4. That any material defect, insufficiency, or claim of novelty for what is in fact not new, voids a patent unless such defect is curable by means and procedure provided in the statute, and unless due procedure is had under the statute. (Secs. 4916, 4917, 4922.)
5. That a defective or insufficient specification can be cured only by procedure under the section relating to reissues. (Sec. 4916.)
6. That a patent, void because it contains, *inter alia*, a claim for what is in fact not the patentee's invention, can, under certain conditions be cured by a re-issue eliminating such void claim, and under certain conditions also cured by a disclaimer. (Sec. 4916, 4917.)
7. That it is an essential condition for the application of the cure by disclaimer that the patent shall embrace and cover "a part which is truly and justly his own" and which part "is a material or substantial part *of the thing patented.*" (Sec. 4917) "and definitely distinguishable from the parts claimed without right. (Sec. 4922.)

It follows then, submit, we that while a reissue is, by the terms of the statute, made a proper remedy for exactly such a case as is contemplated under the sections of the statute relating to disclaimer, a reissue is the only remedy for a defective or insufficient specification of the invention patented, while a disclaimer is only authorized where a patent embodies a specification with a claim or claims of invention which are in themselves effective and sufficient and at the same time contains also a specification of claims which are invalid because for want of novelty or other reason the inventor was not entitled to make such claims.

The reason for the distinction made is a perfectly obvious one Where a patentee has specified and **claimed two things distinguishable, and distinguished in the patent, from each other,** the requirements of the statute have been complied with, with respect to both

things. Both inventions have been distinctly distinguished from what was old and from each other,—the statuary affidavit has been made to both,—the statuary search as to novelty and utility has been made to both. If subsequently it is discovered that one of these separate things should not have been patented, either because it was not new with the patentee or for other reasons, the statutary permission to disclaim that thing, by which the patent is permitted to stand as one covering the other thing, does not impair the protection afforded to the public by the provision of the statute fixing the prerequisites of the Patent grant. They have all been complied with as to the thing which remains after disclaimer, the subject matter of the patent.

But where the invalidity of the patent arises, not solely because the inventor has claimed, in addition to a thing or things which he is entitled to claim, another thing which he is not entitled to claim; but because the *specification of invention is defective or insufficient, then the remedy* and the only remedy provided for, *is by a reissue* of the patent which, under the terms of the Act, involves a redistinguishment and claim of the invention, a new affidavit as to the fact of invention and a new examination by the Commissioner as to the patentability of the invention; and this is logically necessary because were the requirements any less they would permit the grant of a patent without compliance with the essential provisions provided for the protection of the public.

There is not the slightest basis in the statute for the position taken by the petitioner in this case which is, in effect, that a patent, invalid because of a defective and insufficient specification, can be cured not only by the filing and prosecution of a reissue application, but also under the sections relating to disclaimers and which they claim authorizes, not only the inventor and patentee but any owner of any interest in a patent by the **simple expedient of filing an unsworn paper in the Patent office, as to the reception of which the Commissioner has no discretion,** to reframe a specification, change the subject matter of the claims, and **grant himself a new patent for an invention**—not distinguished and claimed as such in the original patent—not sanctioned by the original statutory oath—and never passed upon by the Commissioner either prior to the grant of the patent or pending the proceedings for its reformation.

The statute provides for no form of disclaimer nor does it vest in the Commissioner of Patents any discretion enabling him to ap-

prove or disapprove a paper filed in the Patent Office and purporting to be a disclaimer. Hence the patentee and his counsel were left to their own discretion as to the mode of disclaiming, and from this has arisen a practice which, it may be argued, has received a qualified sanction from the Courts; we refer to the practice which can be traced through many of the reports, of drawing a disclaimer as, in effect, an order for the erasure or cancellation of parts of a patent specification and as though it were an apt and effective means for erasing passages or words of the specification and claims of a patent.

Decisions of the Courts as to Disclaimers.

As we understand the rulings of this Court with reference to such disclaimers and as would appear from the statutes to be necessarily the case, a paper purporting to be a **disclaimer is only valid and effectual to the extent that it is in fact a statutory disclaimer;** whenever it wholly, or in part, undertakes to do more than the statute authorizes, it would seem to be **simply a nullity** But if it is in part a statutory disclaimer, the fact that it seeks to do more than the statute permits, would make it only a nullity as to the parts where it exceeded the functions of a disclaimer, therefore, if a disclaiming paper filed in the Patent Office does in fact disclaim one of two or more things definitely distinguished and claimed in the original patent, it is doubtless effectual to that end notwithstanding the fact that it may purport also to erase from the specification certain passages which relate to the particular claimed invention disclaimed, because, so far as it purports to make erasures, it may be treated either as a nullity or as merely explanatory. But we submit that such a disclaimer can only be a valid disclaimer in cases where the attempted erasures in the specification are absolutely unnecessary to the distinguishment of what is disclaimed and what is retained as the subject matter of the patent. If a redescription is necessary to distinguish and point out the true invention which the patentee is entitled to hold then the patent unmistakeably is defective because of a defective and insufficient specification of invention; then it is manifest that the patentee has never complied with the conditions of the grant of the patent for what he now alleges to be the true invention, and that the Commissioner did not, and never had the opportunity of making the statutory examination with reference to that true invention. In such a case the remedy by

reissue is the only one provided by the statute and the attempt to reissue the patent by disclaimer is absolutely ineffective and null.

The typical case for the application of a disclaimer is where two distinct claims exist, one of which it is desired to cancel; the disclaimer then acts as the pruning knife of a tree, one branch is cut away, another branch is unaffected. Such disclaimers were before the Courts in *O'Reilly vs. Morse*, 15 Howard 62; *Seymour vs. McCormick*, 19 How, 591; *Sessions vs. Romadka*, 145 U. S. 29; *Burdette vs. Esty*, 4 Bann. & A. 7; *Matthews vs. Spangenburg*, 19 F. R. 823; *Torrant vs. Duluth Lumber Co.*, 30 F. R. 830; *Parker vs. Sears*, 1 Fish 99; *Burden vs. Corning*, 2 Fish 477; *Christman vs. Ramsey*, 4 B. & A. 517; *Tyler vs. Galloway*, 12 F. R. 567; *Brainard vs. Crane*, 12 F. R, 621; *Kake vs. Brown*, 37 F. R. 783; *Union Paper Bag Machine Co. vs. Waterbury*. 39 F. R. 389; *Steam Gauge & Lantern Co. vs. Kennedy*, 41 F. R. 38; *Snead vs. School District*, 44 F. R. 614.

There is another series of cases in which patent claims were construed by the Courts to cover alternately two distinct inventions, definitely distinguishable from each other, and in which a disclaimer has been held to be an effective remedy for limiting these claims to one alternative. As no case of this kind has been passed upon as yet by this Court it cannot be considered settled that such disclaimers are in fact effective. The cases we have in view are *Tuck vs. Branhill*, 3 Fish. 400; *Taylor vs. Archer*, 4 Fish. 449; *Libby vs. Glass Co.*, 26 F. R. 758; and *Electric Accumulator Co. vs. Julian Electric Co.*, 38 F. R. 117.

Supreme Court Decisions as to Disclaimers.

An exhaustive examination of the cases passed upon by this Court in which the legislation with reference to disclaimers is considered shows that in no case has a disclaimer been approved which sought in any manner to change the subject matter of the patent and *in no case has a disclaimer been approved which did not in apt and unambiguous language disclaim* **some specific thing** which had previously been claimed in the patent, and further such an examination shows that the Court *has never approved any disclaimer which purported to erase from the specification of the patent words or passages.*

The first case in which the question of disclaimer appears to have been considered by the Court is that of *Cartridge Co. vs.*

Cartridge Co., 112 U. S. 624. It appears from the report of this case that the patent as originally granted covered only the use of a stationary die called a bunter; that it was subsequently reissued with apparently expanded claims which had, or might have, the effect of covering also the use of a movable as well as stationary die. Subsequently an application was made to the Commissioner of Patents for an extension of the term of the patent and the Commissioner, as a condition for the grant of the extension, required the filing of a disclaimer limiting the scope of the reissued patent to substantially that of the original grant. The patentee first attempted to comply with the Commissioner's requirement by filing a paper which in ambiguous language disclaimed the added matter of the reissue except in so far as it might be construed to be the mechanical equivalent for the parts described in the original patent. This was unsatisfactory to the Commissioner and therefore a second disclaimer was filed in which paper it was recited that certain passages had been interpolated in the reissue and coupled with these recitals was the express and unambiguous disclaimer of specific parts as being within the patent; for example, to quote from the disclaimer:

> "And thereupon your petitioner disclaims the said movable die *E* (called a 'bunter') as being the invention of said Ethan Allen, thus leaving the description of said die *E* the same as shown in the original Letters Patent and the drawings thereof."

The question argued before the Court was to the effect of the disclaimer, the plaintiff's counsel contending (see the report of this case on page 367 of 15 Am. & Eng. P. C.) as follows:

> "The reported cases in which the patentees have been held affected by disclaimers previously made by them, as are all cases in which some matter of fact was conceded against himself by the patentee, and he was not afterwards allowed to assert the contrary of the state of fact so established against himself by such concession. In the case at bar there was no concession of fact. There was nothing but the withdrawal from the specification of the improperly inserted clauses, in the most convenient way.
>
> It might as well have been done by reissue, but for the matter of delay and expense and the loss of existing rights of action."

The defendant's counsel, on the other hand, argued (see page 367 of the last cited report) that not only was there no authority in the statute for making a disclaimer for any other purpose than that of narrowing the claim, but that the paper, even if not a technical disclaimer, was *a solemn admission by the patentee which would estop him from claiming that his patent covered the movable die.*

It was with reference to the issue thus made between counsel that Justice Blatchford says in the case:

> "It is a patentee who 'has *claimed more* than that of which he was the original or first inventor or discoverer, '*and only such patentee*,' or his assigns, who can make a disclaimer; and the disclaimer can be a disclaimer only 'of such parts of the thing patented, as he shall not choose to claim or hold by virtue of the patent or assignment.' A DISCLAIMER CAN BE MADE ONLY WHEN SOMETHING HAS BEEN CLAIMED OF WHICH THE PATENTEE WAS NOT THE ORIGINAL OR FIRST INVENTOR, and when it is intended to limit a claim in respect to the thing so not original or first invented. It is true, that in so disclaiming or limiting a claim, descriptive matter on which the disclaimer claim is based may, as incidental, be erased, in aid of, or as ancillary to, the disclaimer. But the STATUTE EXPRESSLY LIMITS A DISCLAIMER TO A REJECTION OF SOMETHING BEFORE CLAIMED AS NEW or as invented, WHEN IT WAS NOT NEW or invented, and which the patentee or his assignee no longer chooses to claim or hold. It is true, that this same end may be reached by a reissue, when the patentee has claimed as his own invention more than he had a right to claim as new, but **if a claim is not to be rejected or limited, but there is merely 'a defective of insufficient specification,' that is, description, as distinguished from a claim, the only mode of correcting it was and is by a reissue.**

There was no question before the Court as to an attempt by disclaimer to erase descriptive matter, for no such attempt was made in the disclaimer, which is quoted in full in the opinion; on the contrary, that paper, while reciting certain passages of the specification and stating that they were inserted in the reissue does not purport to cancel or erase such passages, but **in express and apt terms disclaims the things referred to in such passages** as being within the patentee's invention or the scope of his plans. The point which the Court was considering was the substantial contention by the plaintiff 's counsel that the specification was to be read as though the disclaimer erased specified portions of the description, and did not disclaim and cut out of the scope of the patent specific things. **The point ruled is that a disclaimer is only appli-**

cable to specific things, and, we should take it, that the learned justice in stating the issue, assumed the plaintiff's incorrect position as to the real nature of the disclaimer for the purpose of emphasizing the fact, that **under no form of expression could the disclaimer be effective to change the wording and not the substance of a patent,** However that may be, it is manifest that what the learned Justice says as to the possibility of erasure in connection with a disclaimer is *obiter* and with relation to an issue not raised in argument or by the facts in the case.

The next case to come before the Supreme Court in which they considered the effect of the sections relating to disclaimers was *Hailes vs. Albany Stove Co.*, 123 U. S. 582. The patent involved in this case was for a stove having a fire-pot which, as illustrated in the drawings, had solid walls for about two-fifths of the distance from its top, and perforations or slots formed through the walls in the lower three-fifths of its depths. The claims of the patent were as follows:

> "1. Arranging a perforated fire-pot with a grate bottom within a circular stove having provision for the admission of air below the point of suspension of said fire-pot, substantially as described.
>
> 2. The combination as an annular horizontal register with a suspended fire-pot which has perforated sides, substantially as described."

A prior British patent was offered in evidence by the defendants which embodied both of the above combinations, but showed and described a construction in which the fire-pot was formed with perforations or slots extending through its entire depth. Both the patent sued upon and the British patent in question with their drawings are given in full in the report of the case in 17 Am. & Eng. P. C. 336 *et seq.*

To avoid the effect of the prior patents a disclaimer was then filed in which they disclaimed

> "so much of the claim as covers perforations or openings in the sides of a suspended fire-pot extending throughout the entire depth of its sides, and limits such perforations or openings to substantially the lower half of the fire-pot."

and they claimed

> "a fire-pot suspended from its upper edge with substantially the upper half of its sides made solid, and substantially

the lower half of its sides containing perforations or openings."

This is **emphatically a disclaimer of the thing,** that is to say, of any fire-pot having perforations "extending throughout the entire depth of the sides" as distinguished from one having perforations only in the lower part of the sides of the pot. There was no attempt to erase any of the words of the specification, the attempted effect being purely to *read into the claims a limitation* which did not in fact exist in either of them, either in terms or by reference to the specification of the patent.

In the lower Court (16 F. R. 242), Judge Wallace had said in regard to the subject that if it was true that the patentees defectively or insufficiently described the invention and claimed more than they had a right to claim as new, they could reissue, and then said:

> "*But it is not the office of a disclaimer to reform or alter the description of the invention.* If a patentee has claimed more than that of which he was the inventor, his patent may be valid for all that part which is justly and truly his own, and he may recover upon his patent if the part which is his own be *definitely distinguished* from the parts claimed without right. When there are several claims, some of which he is entitled to and others of which he is not entitled to, the part of the invention which is his own may be definitely distinguishable from that which is not his own, and a disclaimer before suit brought will put him right, and enable him to recover upon his patent as though it had originally been confined to the proper claims; and there would seem to be no objection in such a case to eliminating by its disclaimer such parts of the description as relate to the claims to which he is not entitled and which he abandons. **This, however, is a very different thing from converting a claim from one thing into a claim for something else, and amending the description to effectuate the claim. This might give the patentee a new patent; it certainly would enable him to grant himself a reissue without the concurrence of the Commissioner of Patents.** It would enable him, after others had occupied the field of invention, and by their intellect and experiments discovered what he had never pointed out or claimed, except perhaps, so vaguely that his information was valueless, to deprive them of the fruit of their efforts. When there are distinct claims in the patent, some of which are valid and others not; or, where there is a single claim, but a specification by which the public can definitely distinguish what is new and belongs to the patentee, and what does not really belong to him, although he had claimed it, a disclaimer will right the patentee's mistake, and will work no injustice to others."

In affirming this opinion and with reference to this state of facts, this Court says, through Mr. Justice Bradley:

> "Viewed as a disclaimer, this instrument naturally excites attention. A disclaimer is usually and properly employed for the *surrender of a separate claim* in a patent or some other distinct and separable matter, which can be *excinded without mutilating or changing what is left standing.* Perhaps it may be used to limit a claim to a particular class of objects or even to change the form of a claim which is too broad in its terms; but certainly it cannot be used to change the character ot the invention. And *if it requires a n amended specification or* supplemental description to make an altered claim intelligible or relevant, whilst it may possibly present a case for a surrender and reissue, *it is clearly not adapted to a disclaimer.* A man cannot, by merely filing a paper drawn up by his solicitor, **make to himself a new patent,** or one for a different invention from that which he has described in his specification. That is what has been attempted in this case. There is no word, or hint, in the patent, that the invention claimed was a fire-pot with sides grated only half way, or part of the way, from the bottom towards the top, or that such partially grated sides have any advantage over those grated all the way to the top. The first claim as modified by the disclaimer, has nothing in the specification to stand upon, nothing to explain it, nothing to furnish a reason for it."

It is interesting to note that Justice Bradley throws out a doubt as to whether even as ancillary to the abandonment of a claim, a change in the specification is permissible.

In the case of *Collins vs. Coes*, 130 U. S. 56, the Court, through the Chief Justice, Fuller, cites and approves Judge Bradley's opinion in *Hailes vs. Albany Stove Co.*, as to the proper function of a disclaimer and expressing a doubt to the effectiveness of such a disclaimer as was filed in this case, dismisses the bill for lack of invention.

In *Hurlbut vs. Schillinger*, 130 U. S. 456, the patent in suit was a reissued patent. In the reissue a clause had been incorporated for the purpose, apparently, of broadening the claim of the patent, and a specific claim also inserted in broader terms than the original claim, which was also retained. The disclaimer filed for the express purpose of narrowing the patent purports to enter a disclaimer to certain "words" of the specification, and then continues:

"Your petitioner hereby disclaims the forming of blocks from plastic material without interposing anything between their joints while in the process of formation."

In the argument of the case, as reported in *19 Am. & Eng.* P. C. 544, *et seq.*, it appears that no question as to the proper phrasing of the disclaimer was raised by the defendant, and indeed the only point based in the remotest degree upon the disclaimer was to the effect that it forbade and excluded any subsequent enlargement of the scope of the claims, and the only question considered by the Court with reference to the disclaimer was as to whether or not after disclaimer the patent claimed what could be considered an enlargement upon the claims of the original patent. The Court did not in any manner sanction the attempt to disclaim words, and as the report clearly shows, the disclaimer in fact expressly and in the clearest possible terms DID DISCLAIM THE THING to which the objectionable words related.

In *Sessions vs. Romadka*, 145 U. S. 29, the only point with relation to disclaimers considered and ruled upon by the Court was that it was a proper remedy to cure what may be called multifariousness in a patent which contained claims for several, separately, useable devices.

The last Supreme Court case is that of *Grant vs. Walter*, 148 U. S. 547. The specification of the patent in suit is given in full in the opinion of the Court, and says that the inventor stated as to his invention (see page 548):

"My invention relates to a novel manner of winding silk or other thread upon the reels in a reeling machine preparatory to its being dyed."

Not only in this but in the rest of the specification as quoted by the Court it is clear that the only stated use of the skein was for the subsequent treatment of dyeing. The claims, however, (see page 550 of the report,) are for the skein of thread.

At the hearing of the case the disclaimer printed on page 550 was filed:

"To so much of said claim as does or might make such claim apply to a skein which by reason of its being coated with gum, or by reason of the manner of its lacing, or by any other reason, is not in condition for dyeing for ordinary manufacturing purposes."

The reason for this disclaimer was the proof of the prior existence of skeins having the peculiar form of those covered by the

claims, but by reason of the condition of the thread, unfitted for dyeing. As the Court says, (p. 553):

> "The Grant skein is shown to be an improvement over the earlier skeins for the purpose of dyeing, but neither the specification nor the claims of the patent limit it to that purpose. The disclaimer undertakes so to do, or rather to limit it to a condition in which the skein may be dyed."

The Court considers the patent in question from the double point of view, first, of the competency of the disclaimer, and second, of the patentability of the invention, even if the disclaimer were effective, and the rulings as to both points are, we think, controlling as to the Jones patent.

With regard to the effectiveness of the disclaimer, the Court says, (p. 554):

> "It is settled that distinct and formal claims are necessary to ascertain the scope of the invention. *Merrill vs. Yeomans*, 94 U. S. 568; *Western Electric Co. vs. Ansonia Brass & Copper Co.*, 114 U. S. 447.
>
> If, therefore, the elements of "boiling off," or ungumming the silk, or the dyeing thereof, and of improving the winding facility, were patentable, in view of the prior skeins, they SHOULD HAVE BEEN COVERED BY THE CLAIMS OF THE PATENT. *James vs. Campbell*, 104 U. S. 356, and authorities cited above."

That is to say, you cannot by a disclaimer convert a patent for one thing into a patent for another thing any more than you can accomplish this metamorphosis by reissue, and it makes not a particle of difference that the thing sought to be covered by the amended patent involves, as a part, the thing which was originally covered. The reason for this is obvious, even aside from the fact that such a change is clearly outside of the statutory provision. In the skein case the patentee had specified the physical make up of the skein as his invention, he had made oath to that as his invention, the Commissioner had examined and passed that invention to issue. When the owner of the patent disclaimed the physical make up of the skein he disclaimed all that there was in the patent which had passed through the statutory provisions as to patentability. The specification did not distinguish the peculiarities of the skein which fitted it for use in dyeing as the invention. The patentee had never stated, much less made oath to this peculiarity of the skein as his invention. Perhaps it was not. The Commission-

er had never passed upon the patentable novelty of a skein distinguished from old skeins only by this peculiarity of construction. Therefore to approve such a change in the scope of the patent would have been to waive every statutory requirement and condition of its grant, aside from the single requirement of novelty, which is only one of the statutory requirements.

The second point ruled upon by the Court was that of double use; the Court holding that no invention would be involved in forming the old skein so as to adapt it for use in dyeing, although it is evident from the statements made that something much more nearly approaching invention was required for the purpose than was required for using mixer metal in a Bessemer converter.

We have shown—**that the Supreme Court has never had before it a case in which it was attempted to amend a patent by disclaiming a portion of the specification as distinguished from disclaiming a specific thing covered by the claims;** that they have emphatically ruled that no alteration of the specification is permissible by disclaimer, except as ancillary to the disclaimer of the thing; that is, as we should understand it, as explanatory of said disclaimer; that even the *obiter dictum* on this point, which is contained in the opinion in the Cartridge Co. case is questioned in the Stove case—and that all the cases are consistent in ruling that no change is permissible by disclaimer, which alters the character of the invention originally covered.

Decisions of the Circuit Courts as to Disclaimers.

With the exception of the class of cases previously referred to in which the Circuit Courts have held that a patent with, what may be called, an alternative claim, could by disclaimer be limited to one of the alternatives, a practice which has not received the approval of this Court, the Circuit Court cases are in general in strict accordance with the rulings of this Court; the exceptions are first the case of *Schillinger vs. Gunther.* 17 Blatch 66; 4 B & A 491, where Judge Blatchford specifically held that it was not improper to eliminate or withdraw by the disclaimer, parts or passages of the the specification where such erasures were made in connection with a disclaimer of a claim or part of a claim. This is in accordance with the dictum in the *Cartridge Co. case* but, as we have shown, is not sanctioned by an express ruling of this Court.

The other case, that of *Schwarzwalder vs. New York Filter Co.*, 66 F R 52: 26 U. S. Appeal 547, **stands absolutely alone** in apparently holding that a disclaimer is effective which merely purports to make erasures in the body of the specification. An examination of the report in connection with former decision on the patent shows however, that *the question of the legality of the disclaimer was never raised in any of the litigation affecting the patent*, counsel on both sides having treated the disclaimer as effective and merely argued the question of its effect upon the construction of the patent. See *New York Filter Co. vs. O. H. Jewell Filter Co.*, 61 F.R. 840.

The so-called disclaimer filed and considered by the Circuit Court of Appeals was, in its effect upon the construction of the patent, exceedingly ambiguous and what the Court did was, in effect, *to construe the patent exactly as it would have been construed had the disclaimer not been filed.* The Court could have reached the same result by the ruling, which we think would have been a correct one, that as the so-called disclaimer did not purport to do anything permitted by the Statute, it was to be treated as a nullity or perhaps only considered, not as a disclaimer, but as a public act of abandonment.

The point that erasures as ancillary to or explanatory of disclaimers of specific things are not necessary, was ruled by Judge Nelson in *Torrant vs. Duluth Lumber Co.*, 30 F. R. 830, where His Honor says, (page 832):

> "The disclaimer, I think, is broad enough to carry with it all in the specification which, connected with the first claim of the reissue, discribes an invention whereby the tooth-bar could be used without the knees as a machine for rolling logs to the carriage of a saw mill. * * * This disclaimer refers to the claim in that specification which enlarged the invention, and a fair construction of it would eliminate any operation and use of a tooth-bar covering a different invention from that described in the original patent."

We see no reason to doubt that this ruling would have been approved by the ruling of this Court, and if so, then **erasures in the specification are shown to be unnecessary as well as unauthorized.** In fact it would appear that there is no possible reason why a patentee should attempt to make erasures in the specification except for the purpose of obtaining in a surreptitious and illegal

manner what would be in effect a reissue to correct a defective and insufficient specification of the thing patented.

Adding an Additional Step or Element to the Claim by Disclaimer.

The above discussion as to the case of *Grant vs. Walter*, 148 U. S. 547, shows that this Court found that it was not the proper function of a disclaimer to add to the claim an additional step or element, which is now attempted by the petitioner by claiming that the words "preparatory to further treatment" in the patent as changed by the disclaimer, necessarily mean "Bessemerizing the mixed metal." It will be remembered that the effort in that suit was to limit a claim for the reels wound in a certain way to such reels as were in condition for being dyed, by limiting the claim to such reel, "preparatory to its being dyed." This Court held that such was not the proper function of the disclaimer.

Of the Circuit Court cases having a direct bearing on the so-called disclaimer filed by the Carnegie Co., we would refer your Honors to *Rumford Chemical works vs. Lauer*, 5 Fish, P. C. 615. The patent involved in that case was for pulvurulent phosphoric acid as a new article of manufacture. The specification of the patent stated the preference of the patentee for mixing starch with the acid and on it being shown that the article as claimed was not new, counsel argued that a disclaimer might be filed limiting the claim to the specific mixture of the acid with the starch. With reference to this the Court, Judge Blatchford, said:

> "It was suggested on the hearing, that as the defendant uses starch with his acid, and as the plaintiff's patent states, as its preferred method of preparing the acid, the use of starch in it, the first claim ought, at all events, to be held good for the acid when prepared with starch in it, on the ground that starch had never before been used as an ingredient in it. This view was urged on the idea that the case falls within Section 9 of the Act of March 3rd, 1837."

Then after quoting the language of the Statute the Judge continues:

> "This section has no application to the case. It is designed to allow a patentee to recover on one claim of his patent, notwithstanding other claims in it are void for want of novelty. But it required that the parts claimed without right, and the parts rightfully claimed, shall be definitely distinguishable, as matter of fact, on the face of the claims—that is, be definitely distinguished from each other in the claims. Here

there is no distinction in the claims between acid prepared with starch and acid prepared without starch. If there was a claim to the acid prepared without starch, there might, under the Statute, be a recovery on the former, although the latter were void for want of novelty, provided there had been no unreasonable delay in filing a disclaimer to the latter."

Another case having a direct bearing on the case before the Court is *White vs. Gleason Man'f'g. Co.*, 17 F. R., 159, in which case an attempt was made by disclaimer to cover a combination shown and described but not claimed in the original patent. As to this, the Court said:

"The effect of the disclaimer is to change the effect of the invention covered by the patent from the arms to the center, * * * having taken a patent for globe holders with such arms, he could not by disclaimer change it to a patent for a globe holder with such centers although such centers were well shown. Such changes appertain to reissue and not to disclaimers."

The last important decision on this subject is directly a point, as to this question. We refer to *Albany Steam Trap Co. vs. Worthington*, 79 F. R. 966, which it is to be noted was decided by the Circuit Court of Appeals for the second circuit, the same Appellate Court which decided the Filter case, and which shows how that Court would rule where an additional step is aided to a process by a disclaimer.

The specifications and drawings of the patents in suit showed and described, in connection with a steam circulating system for heating buildings and a boiler, a pump and valve for admitting water to the pump. The claims, however, were distinctly, as the Court finds (p. 968), for pump regulating valves *irrespective of the particular system* with which they were used.

A disclaimer was filed by the patentee in which, alleging the claims to be too broad, it "disclaims" any apparatus as included in the claims of said patent which is not directly connected with the return pipe, *H*, under the pressure of the return from the heating system, without escape to the atmosphere.

The Court, Judge Lacombe, after noting that, as interpreted in connection with the disclaimer, the invention is a meritorious one, continues:

"The difficulty with this contention is that it **substitutes a different invention froma tht described and claimed in the**

patent. It is not a narrower one, but a different one. It is, as defendants suggest, 'an attempt to *incorporate into a claim* for a combination, *a feature which had not been claimed* in connection with that combination before, and thereby make a new combination.'"

Then after instancing a hypothetical case of converting by disclaimer a patent for a circular saw into a patent which would limit the use of this circular saw to cabinet making machinery, the Court says:

"But it would be a startling proposition that he could 13 years afterward file a disclaimer of any combination containing circular saws, except such as might be used in cabinet making machinery, and then insist that he was entitled to sustain his claim to cover all circular saws so used, (with his improvement or without) on the theory that no one had used them in that branch of the art before.

"We do not understand that the statutory provisions allowing a disclaimer to be filed can be thus availed of to change the invention claimed in a patent, and we are referred to no authorities which sustain complainant's contention. The object of a disclaimer is well expressed in *Chemical Works vs. Lauer*, 5 Fish. Pat. Cas. 615."

In the above review of the decisions of this and the lower Courts, we have had mainly in view the broad proposition that the law furnishes no warrant for what has been attempted by the Carnegie Company, namely, the revision of a specification by erasures made under the guise of a disclaimer. Absolutely no approval of such a practice can be found in any of the cases, with the possible exception of the Filter case in which, as we have above noted, the question of the legality of the patentee's course was never raised or brought to the attention of the Court, in which case the so-called disclaimer was not in fact considered by the Court as effective, the patent being considered as though no disclaimer had been entered.

Apart from the broad proposition, however, the decisions are absolutely in point with reference to the Carnegie Company disclaimer in their uniform ruling that the subject matter of the invention cannot be changed by a disclaimer irrespective of what form the disclaimer may take; and under the ruling of this Court in *Grant vs. Walter*, **it is clear that this patent which, so far as the second claim is concerned, is a patent for mixing pig metal, cannot by any mode of disclaimer be changed into a patent for making steel, certainly not into one for making Bessemer steel.**

Apart From Its Effect Upon the Scope of the Patent the Disclaimer is in Effect an Abandonment of the Invention as Patented.

It is unquestionable that an invention may be abandoned, either before or after patenting, if its owners see fit. There is much room for discussion as to what acts would constitute an abandonment of an invention, but it seems to us that no act could be more positive and efficacious than the filing in the Patent office at Washington of a paper over the signature of the owner of the patent, setting out, as the disclaimer filed in this case does, that

> "*The specification of said letters patent is too broad, including more than the invention of said patentee.*"

Your Honors will remember that this solemn admission of the invalidity of the patent was made after all the testimony in the case had been introduced, and after the case had been argued and submitted in the Circuit Court, the **Carnegie Co., under the advice of its counsel, was then satisfied that its patent was invalid,** for the reason that it alleges in its petition, and it proceeded at once to notify the whole world of this fact. It hardly seems possible that so solemn and public a declaration leaves the owner of the patent free to claim that his patent is in fact good and valid and that his solemn declaration remaining for all time on file in the Patent Office does not justify the public in taking him at his word and using the alleged invention without accountability to the ex-patent owner.

It is true that the disclaimer is a nullity in its proposed remedial steps and that it cannot be considered as affecting the construction of the patent; but if the patent was, as the Carnegie Co. has alleged, invalid because of a defective and insufficient specification, then they either had, and still have, a remedy in the provision of the statute with reference to reissues, or, if that remedy does not apply, they have no remedy and their patent is and always has been and must always remain, an invalid patent. It seems to us that in the face of their solemn and public declaration of the invalidity of their patent they are estopped from claiming that the patent is good and valid, unless and until they have taken proper and efficient steps to remedy the cause of invalidity which they pointed out in the paper filed with the Commissioner of Patents.

If the Carnegie Company had published in the newspapers of the country a declaration over their official execution to the effect

that their patent was invalid they would certainly be estopped from subsequently claiming against users of the process that it was good and valid; but what they did was a much more solemn and binding act; they made their declaration of invalidity a part of the archives of the Government, they went back to the Patent Office where their grant is recorded and caused this declaration of invalidity to be practically affixed to the record. We do not see that injustice is done such a patentee in holding him to his declaration, especially as the declaration does not estop him from reviving the patent by reissue or any other legal means, if such means exist.

It is of course to be recognized that the Courts do not favor the finding of abandonment and are disposed to give remedial measures provided in the statute the broadest possible scope. Thus it has been held that an unduly expanded reissue of a patent may be saved as to the part to which the patentee is justly entitled by proceeding to eliminate claims improperly added to the original grant by means either of reissue or disclaimer, but to hold that a patentee who has filed in the Patent Office a solemn admission of invalidity, is not affected in any way by such an act, would be equivalent to holding that an unduly expanded reissue unamended by either a subsequent reissue or disclaimer is to be construed as though it covered only the subject of the original patent because the expanded claims are null. It seems to us if a patentee is to be relieved of the effect of his solemn admission of invalidity and if that relief cannot be effected by disclaimer, that he can only revive his patent by a recompliance with the requirements of the patent law, through asking for a reissue, if his case can again pass through the examination provided for in the Patent Office, he will come before the public in exactly the same position as a patentee who had re-reissued his patent to eliminate improper matter added by a first reissue.

INFRINGEMENT.

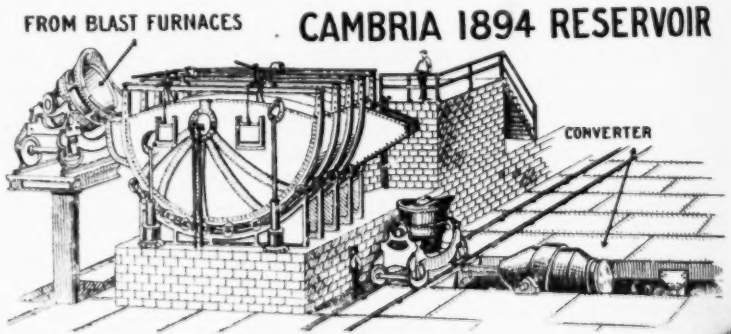
The question as to whether or not the respondent uses the patented Jones process has been practically covered in the discussion relative to the true construction of that patent and particularly under the first question of construction discussed, namely,—whether the patented process is one in which the molten metal is mixed so as to obtain a uniform product,—or one in which it is mixed without reference to the uniformity of the product and with the sole design and effect of preventing sudden variations in the silicon contents of consecutive converter charges drawn from the mixer.

Of course if our last preceding proposition is sound, viz: that the filing of the so-called disclaimer estops the Carnegie Company, from claiming that their patent is valid, at least until they have taken efficient remedial measures is sound, then the case need be considered no further as the bill clearly must be dismissed. But if there is no estoppel then, for the reasons we have given, the so-called disclaimer is absolutely without force to change or modify the construction of the original patent,—first, because if the erasures sought to be made were permitted no material difference in construction would follow, and,—second, because under the law, as laid down in the statutes and interpreted by this Court the disclaimer is absolutely without force to effect the erasures and make the changes in construction which the Carnegie Company has sought to make.

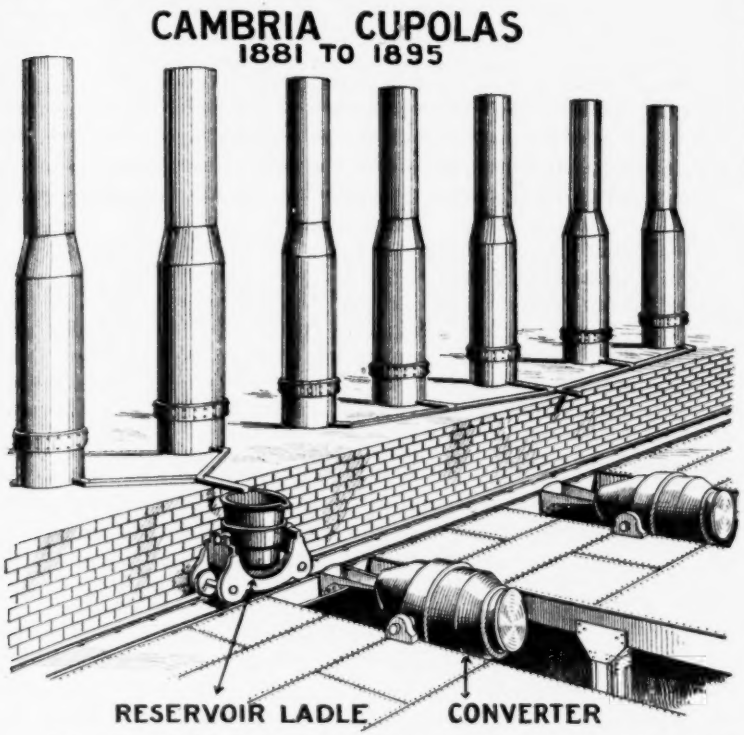
The question of infringement is then to be considered with entire disregard of the so called disclaimer.

Proofs as to Respondents Practice.

Respondent's plant is shown in the record, page 35, the same drawing being printed in this brief in connection with the discussion of the Bessemer Ladle Practice.



The plant complained of is shown in the above cut: Standing beside this plant, and feeding the molten metal to the same converters is the plant shown in the following cut which has been in use for many years prior to the Jones patent, and of course is not claimed to be an infringement:



The nature of the respondent's practice claimed by the petitioner to be an infringement of the Jones patent was made the subject matter of a stipulation between the parties which is printed on page 64 of the record and reads as follows:

> "That the defendant in this case has used the mixer and other apparatus shown in blue prints, "Complainants's Exhibit Nos. 1 and 2 of defendant's mixer," together with blast furnaces at Johnstown, Pa., since a date prior to the commencement of this suit, and at various times since that date in the manner following: That is to say, the molten pig metal has been tapped from the several blast furnaces, four or five in number, and poured into the mixer, which has an actual capac-

ity of about two hundred and eighty tons, additions to this molten metal from the blast furnaces being made from time to time to the mixer in quantities of about fifteen tons **as it is tapped from the blast furnaces;** and the molten metal in the mixer has been discharged by tipping the mixer from time to time, and **as required for charging the Bessemer converters,** into ladles having a capacity of about fifteen to eighteen tons each; the charges withdrawn being from about eleven to twelve tons each; that **the amount of molten metal in said mixer varies from nothing to its full capacity, depending on the supply and demand, the supply being generally sufficient to keep the mixer more than half full of molten metal,** which metal remains molten therein; that the molten contents of the mixer are drawn off from time to time **as required for the converters,** the converter charges being from eleven to twelve tons each, as above stated; the metal being charged into the converters in a molten condition: and sometimes a smaller portion being withdrawn from the mixer, and the remainder of the molten metal for the charge being run into the ladle containing the mixer metal from cupolas forming part of the converter plant, the combined charge of mixer metal and cupola metal being introduced into the converters and refined in the usual manner."

This stipulation, as the immediate context shows, was agreed upon by counsel as supplying the place of, and avoiding the necessity of rebuttal with regard to, the evidence previously introduced by petitioner and which was evidently insufficient and, by stipulation, partly incorrect; especially is this so with regard to the statement of the witness, Upton, with regard to the presence and purpose of a chalk mark on the mixer which indicated. Mr. Upton thought, that the mixer was not to be emptied beyond a contents of one hundred and seventy-five tons. See his answer to Q. 21, p 62. A statement which, although repudiated by the stipulation, was incorporated in the opinion filed by the Circuit Court Judge.

The facts as agreed upon in the stipulation made at the end of the petioner's case in chief remained unquestioned until the close of the respondent's testimony, when at the end of the cross-examination of the respondent's witness, Morgan, the petitioner's counsel (see bottom of page 422 and page 423) alleged that certain statements made by Mr. Morgan were at variance with the facts agreed upon in the stipulation, and gave notice that with regard to these facts he would not consider himself or his client bound by the agreements

We do not consider that Mr. Morgan's statements of facts are in any way inconsistent with the stipulation, and therefore protest against the alleged inconsistency being made the pretence for its repudiation, though, if the Court should be of the opinion that any fact stated by Mr. Morgan as within his positive knowledge, is inconsistent with the stipulation, we have not the slightest desire to contend that the stipulation should exclude such statements of fact from consideration. The parts of Mr. Morgan's testimony which the petitioner's counsel in the Court below referred to as inconsistent with the statements of the stipulation were as follows: First, a passage from the witness's answer to Q. 9; the passage being that of the paragraph first beginning on page 379, and reading as follows:

> "The blast furnace metal storage reservoir at Cambria works is **used in the same way as the cupola ladle,** viz: it is filled with successive taps from the furnaces as the iron may be ready. Successive heats or parts of converter heats are drawn from it into the cupola ladle as required. In accordance with the **natural way of using a reservoir,** it is ordinarily kept well filled up. This reservoir **incidentally equalizes** to some extent the composition and temperature of the various taps put into it."

Second. A passage from the witness's answer to Q. 10, (p. 382) which reads as follows:

> "Again, the obvious method of using the large reservoir is the one in which the reservoir or accumulating ladle is used in cupola work, viz.: as fast as it is partially emptied into converters to fill it up by fresh charges, thus performing the **precise operations which have been performed from the beginning of Bessemer work** in America.
>
> "I have said that this method of using a reservoir is natural and inevitable, which I may also explain by saying that the word reservoir conveys to the mind of an engineer such a use as in water supply. A water reservoir is to be kept full by constant replenishing by pumping or by gravity additions, and being so kept as full as possible is thereby valuable as a reservoir of house or city supply; from which such quantities may be taken at any time as may be needed. If the reservoir is to be filled at one time on one side and drained empty at another time on the other side, it ceases to be such convenience, as we naturally expect to get in a reservoir, and an engineer who would use a reservoir in this fashion would be lacking in good judgment."

Third. The witness's answer to ×-Q 62 (p. 397), which reads as follows:

> "A. I have some recollection of the chalk mark on the end of the reservoir in the early days, but my impression is that the **necessities of the converting works predominate** and the **height of metal fluctuates to a considerable extent.** I do not know of any regulation on the subject. Say for practical reasons which apply to all storage vessels, including the long used cupola ladle, the best practice is to keep them well filled up."

And lastly, the witness's answer to R-d. Q. 180, question and answer being as below quoted:

> "R-d. Q. 180. What is the fact as to fluctuation, if any, in the quantity of metal in the mixer or reservoir in the ordinary Cambria practice?
>
> "A. I believe our practice is to keep the reservoir well filled up. **I am unable to give you the amount of fluctuation.**"

We find nothing in these scraps of testimony; especially when read in connection with their context, which is not in perfect accord with the facts as agreed upon in the stipulation.

Mr. Morgan, in the above testimony, makes clear that the principle governing the operation of the reservoir is simply reservoir action like the old cupola Bessemer ladle, in which, as fully shown in the case, the amount present was regulated by supply and demand, and the ordinary water reservoir which, as all know, is regulated in the same way, and in this he corresponds to the stipulation. He also shows that the custom is to keep the vessel well filled up, and in this his evidence corresponds to the stipulation and also to the ordinary use of a reservoir as well explained by him. His statements also agree as to the amount of metal being **governed according to supply and demand,** as he states that the vessel is filled from the furnaces as the iron may be ready, and that metal is withdrawn for the converter as necessary;—that the necessities of the converter works predominate, and the height of the metal **fluctuates to a considerable extent,** and that there is no regulation on the subject,—while he shows the analogy even in this point also to the water reservoir. He also fits in with the ordinary definition of a reservoir, such, for example, as that found in the Century Dictionary:

Reservoir.

"Doublet of Reservatory. 1. A place where anything is kept in store; usually applied to a large receptacle for fluids or liquids, as gases or oils. 'What is His (God's) creation less than a capacious reservoir or means formed for His use, and ready at His will?'—Cowper. 'The fly wheel is a vast reservoir into which the engine pours its energy; sudden floods alternating with drouths; but they succeed each other so rapidly, and the area of the reservoir is so vast, that its level remains uniform.'—Ball. Experimental Mechanics."

"Specifically—2. A place where water collects naturally, or is stored for use when wanted, as to supply a fountain, a canal, or a city, or for any other purpose."

It was with the stipulation and all the testimony as to respondent's use, including Mr. Morgans, before it that the Circuit Court of Appeals found (see its opinion, p. 1121-2).

1. That the stipulation sets out the respondent's use with substantial accuracy.

2. That the respondents present use is substantially the same as their use of reservoir ladles prior to Jones' invention.

3. That the mixing in respondent's reservoir is only such as is incidental to its use as a reservoir and as such was disclaimed by Jones as a condition of the grant of his patent.

4. That to hold respondents as infringers would be to construe the patent as covering what was well known before Jones' invention.

We will show you that these conclusions are all inevitable but for the present and under this caption, will confine ourselves to a discussion of the bald technical question of infringement.

To resume—: The purpose of the petitioner's counsel in disputing the binding force of the stipulation is not so much to change anything, as to engraft upon the admitted state of facts the further assumed fact that the defendants have recognized the value of the practice of working their reservoir so that it will as a rule be more than half full of metal, such metal constituting what the Circuit Court calls a *dominant pool* and having the effect of preventing sudden variations of silicon upon which effect the Circuit Court judge dwells with so much emphasis in his opinion. This is not the reason which Mr. Morgan gives for preferring to keep the reservoir well filled with metal, Mr. Morgan pointing out that this condition of use is incident to the use of the reservoir as such, that is to say, as a place for storing the molten metal. But, as we have

pointed out in discussing the question as to whether or not the patent calls for the **presence of a dominant pool,** the fact that a dominant pool is used is from the most favorable standpoint established by an examination of the patent, **absolutely immaterial to the question of infringement,** while from the position taken by Mr. Gayley and the other witnesses for the petitioner, the maintenance of a dominant pool is a factor inconsistent with the use of the Jones invention because, as they state, the use of the dominant pool is inconsistent with, and **incompatible with the production of substantially homogeneous metal.**

If we infringe the Jones patent at all it is certainly not because we maintain a residue which is generally more than half of the full charge of our reservoir and not because we do this for one purpose or another, but simply because, *inter alia*, we do not, before recharging our reservoir, "*entirely drain or empty the same*" as the claim expresses it, or because we, as a rule, maintain "*a considerable quantity*" "unpoured" as the specification sets out. It **certainly cannot** *be* as we have, we believe, made clear, because we maintain a quantity of metal in our reservoir which is greater than any amount suggested in the specification or claim of the patent.

For the above reasons it is absolutely immaterial to the defendant whether the admitted use be varied as the petitioner's counsel contend or not, but it is important that this matter of the defendant's use should not be permitted to become vague, uncertain and shifty so that the petitioner's counsel can treat it as they attempt to treat their patent.

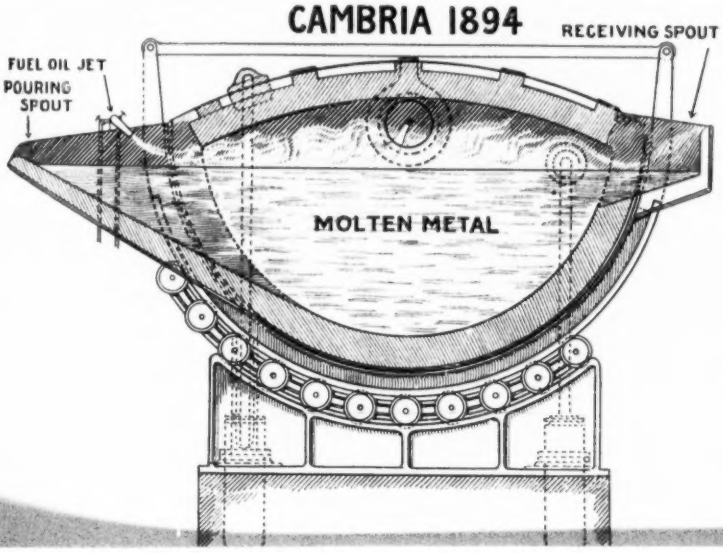
Again there is a consideration which would seem to negative any possible importance of the alleged variation between the facts recited in the stipulation and those contained in the testimony of Mr. Morgan, to wit: the fact that **petitioner was perfectly satisfied to accept the statements of the stipulation and to rest its entire case in chief upon these facts.** If then, in the opinion of counsel and experts, respondent's use, as recited in the stipulation, was an infringement upon the Jones patent during the opening testimony and during the entire rebuttal testimony of the respondent, there cannot be any very essential difference between the admitted facts and testimony of Morgan. The patent under consideration is the same patent and if the facts were sufficient to make out infringement during the earlier stages of the case they must have also been sufficient during the later stages of the case, and presumably any

variation from these facts would be in the direction of avoiding infringement.

Respondent's Plant and Practice.

The respondent's use, as established by all the evidence, is, briefly, as follows:

They have at Johnstown a large number of blast furnaces in which they make pig iron, and they have there also a Bessemer steel making plant consisting of converters in which they convert pig iron into Bessemer steel. They have also a huge reservoir or tank, holding, approximately, three hundred tons of molten pig iron, into which all of the pig made in the blast furnaces is dumped as it is produced and without selection or reference to the particular quality of the iron which happens to be ready for delivery. From this huge reservoir the melted iron is poured into charging ladles which convey it to and dump it into the Bessemer convertors. At the beginning of each week the great reservoir which has been emptied over Sunday is filled or approximately filled by metal from the blast furnaces before the process of converting the iron into steel is begun and thereafter until the end of the week the iron is **dumped into the reservoir as it is made and poured from the reservoir as it is wanted** until, at the and of the week, the production of iron is stopped and the pouring out is continued until the reservoir is emptied.



Of course the respondent's plant is calculated with a view of producing pig iron ready for Bessemerising just about as rapidly as the converter part of the plant is adapted to use it, but in the nature of things it is impossible to make the producing and consuming ends of the plant keep step with each other; at times the converters will be using more pig iron than the furnaces are producing and at times the furnace will be temporarily producing more iron than the converters are using. This is so because the running of blast furnaces is a rather delicate operation. To run them properly they must be tapped and the metal run off at the proper time and if at that time no converters are ready to receive it it must be held until the converters are ready for it. It was to meet this condition, we are told by Mr. Morgan, who is the superintendent of the defendant's works, that they installed their three hundred ton reservoir, that is to say, it was a place in which all the metal could be received from the furnaces when they were ready to deliver it and in which it could be stored until the converters were ready to receive it, and it was also a place to which the converter man could always go with the **certainty of finding metal ready** for him when in the runnning of his plant it was ready for it. The big reservoir is thus simply analagous to a balance wheel, equalizing the irregularities in supply and demand and it performs exactly the same function that is performed by a city water reservoir supplied by pumps. An ordinary pumping system would at times furnish more water than was being drawn off throughout the city for use, and at other times it would not furnish as much water as was being drawn off, hence a reservoir is supplied into which pumps can deliver continuously at a rate calculated to supply the average demand, the reservoir being big enough to hold at all times a **reserve of water sufficient to fill the maximum demand.** Such reservoirs are one of the commonest expedients in the arts and to perform their function as an equalizer they must always be of such size and always be so managed as to provide, as far as possible, a reserve for the material stored. This is obviously necessarily and is in fact applied by the very name of the receptacle, *reservoir* implies *a reserve.*

The Mixing Occurring in Respondents Reservoir.

Now in the ordinary operation of a storage reservoir there is **an unavoidable mixing together** of whatever fluid is charged into it; such a mixture of the iron from the blast furnaces unquestion-

ably takes place in the defendant's reservoir and it is probable that, while nothing approaching substanial uniformity in the character of the metal produced is effected by this mixing and nobody alleges that such uniformity is produced, the consecutive converter charges poured from the reservoir vary less abruptly in their silicon contents than would be the case if the metal was used just as it came from the furnace and without passing through the reservoir. Petitioner's expert witnesses tell us that the evidence of abrupt variations in the silicon contents is a matter of very great importance in the operation of the Bessemer converter; the respondent's expert witnesses on the other hand express the opinion that it is a matter of very little importance. (Woods, p. 172; Hunt, pp. 307-321; Robison, p. 353; Morgan, p. 377. To the same effect see paper of petitioner's witness Gayley, p. 1078). Probably both sets of witnesses are right with respect to particular conditions which they have in view, for it is quite concievable that what Petitioner's witness say could be true with reference to furnaces producing very irregular metal and at the same time what the respondent's witnesses state equally true with reference to furnaces producing more uniform metal. A study of the development of the art would seem to indicate that what petitioner's witnesses state is historically true, while what the **respondent's witnesses state is true of modern furnace practice.**

But, as bearing on the question of infringement, it is absolutely unimportant whether the alleged advantage in the Bessemer process incident to the avoidance of sudden variations in silicon is secured or not, because, as we have shown you, the operation of Bessemerizing is not an element or step of the claim or of the described invention, because the patent contains no allegation that the process or operation of Bessemerizing was to be improved or was improved by anything effected by Jones' process and because the mixing specified by Jones was a mixing which effected not a gradual variation in silicon without producing uniformity in the non-metallic constituents of the iron, but of one which produces substantially homogeneous and uniform iron, to the sole end that the product, no matter by what subsequent treatment it was produced, would be homogeneous and would produce "**articles** of a single order of homogeneous composition."

Now, **the articles** we produce are primarily Bessemer steel and finally rails and other articles made from Bessemer steel, and it is a

regrettable fact that our steel and our rails are not "of a single order of homogeneous composition," but do in fact vary within quite extensive limits in the percentage of the non-metallic constituents of the iron. This is an undisputed fact. Nobody has ever charged that we infringed this Jones patent because we produced substantially uniform and homogeneous metal. **The claim of infringement is solely based,** not even on an improvement in the character of the product, but solely **upon the evidence of abrupt variations in silicon in the metal delivered to the converters,** and we submit here that, even if it were true that we erected and used our reservoir for the sole purpose of preventing sudden variations in the metal delivered to our converters, and even if it were true that this was most important in the operation of making Bessemer steel, and even if it were true that this mode of making Bessemer steel had not been used or published prior to the date of Mr. Jones' patent,—we are at perfect liberty, so far as the patent is concerned, to use this process, because it is not the process described or claimed in the patent, but is in fact a process relating to a different art and effected by different means to those which form the subject matter of the claim.

As a matter of fact, however, the mixing which occurs in the reservoir in only such mixing as is incident to the use of the reservoir as a place of storage and its use in the ordinary and natural way, in which it can be used to perform the functions of a reservoir. Now, as we understand the rulings of this Court and the true intent and meaning of the patent statutes, whatever may be the scope of Mr. Jones' claim, the one certain fact is that it **does not and cannot cover such mixing of molten pig metal as is incident to its storage in a reservoir** into which it is delivered from the producing furnaces and from which it is drawn for use, and this is so, because the Patent Office proceedings show that Mr. Jones originally went into the Patent Office with an application which purported to cover a process of **storing and mixing** pig metal, and because his application for this invention was rejected on older patents and publications showing that it was not new to store and mix metal in reservoirs, and because, in consequence of this action, Mr. Jones, through his attorney, redrew his application papers so as to limit them to a process of mixing pig metal to a standard composition, and for the sole purpose of obtaining homogeneous metal, pointing out to the

Commissioner of Patents that this was a different process from the one in which the metal was stored with only incidental mixing, because, as the attorneys explained, uniformity in product could not be obtained and had never been obtained as the mere result of storing; selection was necessary to uniformity, and storage excludes selection. So different did Mr. Jones esteem his process of mixing to a standard composition to be from a process of storing with incidental mixing, that he made a *new affidavit to his amended specification and claims.* The effect of these proceedings in the Patent Office was to carefully exclude, or, in the language of Sec. 4888 of the Revised Statutes, "distinguish" the invention of mixing to a standard composition from the other invention of storing the metal with more incidental mixing.

Petitioner's Position as to Storage.

So manifest is the exclusion of a process of storing with incidental mixing from the scope of the patent that petitioner's counsel and experts have always made a pretense of admitting that we were entitled to store our metal if we chose to do so, but it was only a pretence, for their claim is that while we can store the metal we must not do it in the way in which metals or other fluids have always been stored previously, we must find some new and heretofore unknown way of storing, or else, while at liberty to store we still infringe the alleged Jones invention. Thus, Mr. Gayley the principal expert witness for the plaintiff, says in answer to Q. 185, page 546:

> "A. The Jones mixer was not installed as a reservoir at the complainants' Edgar Thomson steel works, nor has it been considered to be specially valuable for that purpose. At the starting of the mixer the attention of everybody concerned was directed to the analyses of the successive ladles taken from it in order to observe the character of metal it produced. The reservoir feature and the advantage in supplying uniform weights to the converter are comparatively unimportant."

And again in answer to Q. 188, see page 548:

> "The mixer never would have been introduced at our works on account of its reservoir functions. The whole thought was mixing; there was no need of it for any other purpose."

and again in answer to Q. 188, on page 547:

> **"The use of a reservoir simply as such, between the blast furnaces and converters, is a step backwards."**

What does it all mean? In effect Mr. Gayley says, and this is the position of petitioner's counsel—Reservoirs were old devices for storing molten metal. It is quite true that you had a perfect right to store your iron in a reservoir but, on the whole, reservoirs are of no particular advantage. You really do not need to store your metal. Therefore, petitioner contends that you do not store your metal because you want to *store* it, but you do store it notwithstanding the disadvantages of storing, because you want to obtain the mixing incident to storage with a view of avoiding abrupt variations in the silicon contained in the metal which you send to your converters. To be sure you are doing nothing more than was taught in the art and disclaimed and distinguished from the Jones patent, but you **must not do it because your purpose is not, we believe, to avail yourself of previously recognized functions of storage,** but is, we think, to avail yourself of an obscure advantage which we allege to exist in the use of the stored metal in Bessemerizing and which advantage is not, to be sure, pointed out in Jones' patent, but was the real advantage secured by Jones as a superintendent when he applied, not the process of mixing to a standard composition, but the old reservoir process of storing the metal in the Carnegie Company's works.

The above is in substance not only the view deduceable from the testimony of petitioner's experts and from the argument of its counsel in the lower courts, but is also the view entertained and acted upon by the Judge of the Circuit Court and forming the key note of his elaborate opinion.

Was such an issue ever heard of before in a patent suit? Was indeed, such an issue ever before seriously considered in an American Court, either of law or equity? To find a precedent we must go back to the Spiritual Court, for never since the activity of the unlamented Courts of Inquisition has the matter of a man's intention in doing a confessedly lawful act formed the basis of a judicial order depriving him of his property and means of livelihood. Modern precedent for such must be found in the injunction of the indulgent but anxious parent to her child who sought permission to "go in to swim"—"Yes, my darling daughter, hang your clothes on a hickory limb, but don't go near the water."

This Court has never permitted itself to hesitate in affirming the rights of the public to continue the use of any known process

because of real or alleged discoveries of peculiar advantages in such use. Thus in *Lovell Mfg. Co. vs. Carey*, 147 U. S. 623, the Court says:

> "The public cannot be deprived of an old process because some one has discovered it is capable of producing a better result, or has a wider range of use than was before known."

See also *Roberts vs. Ry er*, 91 U. S. 150; *Ansonia Co. vs. Electrical Supply Co.*, 144 U. S. Under the above rulings it would make no difference whether we used our reservoir primarily as a place of storage or with a view of mixing to avoid sudden variation, but the evidence is overwhelming to the effect that our use is dictated by the necessity for storage, and not by what the Circuit Court Judge called the **"Crying Need"** of a means to avoid abrupt variations.

That there was at the time of Jones' invention a "crying need" of a new mixing process to avoid abrupt changes in silicon is not shown.

Direct metal had been used in Bessermizing from the first all over the continent of Europe. (See pp. 764, 755, 780, 786, 787.)

Direct metal was in common and successful use in England. (See pages noted above.) The mixing of molten direct metal to avoid sudden variations in silicon was successfully practiced at West Cumberland. (See Holley's Report, pp. 834–5.) The plan of avoiding sudden variations in silicon by mixing the ununiform molten metal to even up its composition was the subject matter of patents and publications. (See Holley's Report, pp, 833, 840, 845, Deighton's Patent, p. 982 and Snelus' article, p. 789.)

Direct metal was in common use in America both at the Carnegie works and those of the Illinois Steel Co, (See 25, 262.)

The fact that mixing as a remedy for ununiform silicon was a well known expedient and that the leading American manufacturers using direct metal did not deem it advisable to employ it, shows that there was no "crying need" for evening up in composition. If there had been such need the remedy was known, indeed "obvious," as Mr. Holley says in his 1877 report, (pp. 833, 845).

On the other hand, the advantage of storing the molten metal between the furnaces and convertors had always been recognized and such storage practiced in the American works. The advantage in the practice being (*a*) That the furnaces were tapped when they were ready and not before or after the proper time. (*b*) That

the converters could always receive a *full* charge when ready to receive it. (c) That a certain desirable mixing incident and unavoidable in storing the metal was availed of. (See pp. 263, 377, 160). When the modern blast furnaces with their enormous production were used for supplying the converters the need of storing the metal became imperative. All the reasons which dictated this practice in the American mills using remelted metal were not only in full force but were intensified. The defendant, for instance, has a row of furnaces producing fifty tons at a tap and four to six hundred tons each per day (Morgan, p. 379); the total daily product treated running up to two thousand tons. With such a mass of iron to handle it is inconceivable that it could be dealt with without intermediate storage, and such storage was only not a "crying need" because it was a familiar and advantageous expedient with the small production of the older practice and resorted to as a matter of course when the larger production of the modern furnaces was to be handled. In fact it is this *necessity* for storage in handling the huge modern product of the furnace which has rendered obsolete and impracticable and unpracticed the scheme devised by Jones of mixing the molten metal to a uniform composition, for true storage, which we *must* have, is incompatible with that selection of metal charges to be mixed which, as Mr. Carnegie so convincingly explains, is essential to the production of a uniform mixture.

The conclusive proofs that necessity for storage was the controlling factor in the direct metal practice when respondent installed its plant are hereafter more fully developed under the title, "The Crying Need."

Before leaving this matter of our conceded right to store and our disputed right to avail ourselves of the mixture incident to storage, we wish to call Your Honors' attention to the fact that the record shows many *instances of storage of pig metal in actual practice*, and also embodies many patents and publications in which the storing of pig metal is described. With regard to most of these publications petitioner's expert witnesses have pointed out that, while they describe the storage of pig metal, they do not in clear and unambiguous words state that the reservoirs shown and described were to be used with a reserve of metal, and these expert gentlemen assert that in the absence of such express statements in the publications, it is to be inferred that the reservoirs were not used with a

reserve of metal, but were alternately filled and emptied. A moment's thought will satisfy Your Honors that this assumed way of using a reservoir and of storing metal is one which presents very grave practical difficulties, exactly such difficulties as would be met with if the city reservoir, instead of being used as an equalizing device, was first filled with water and then the pumps stopped until it was empty. But when you come to examine the evidence as to the practical use of storage reservoirs for molten metal you will find that, without exception, they were always used with a reserve. This mode of use is also pointed out in the Kirk publication, to which Mr. Jones was referred in the Patent office, and you will also find it described in many of the publications, although not in all of them We mention these facts, and Your Honors will find them to be absolute facts when you come to examine the evidence as to the prior art, because they exhibit the distinguished experts for the Carnegie Company in the position of stating that where the mode of use of a device described as a storage reservoir is not stated in words, it is to be inferred that the reservoir was used as no reservoir ever was used in the arts, and not in the way which every reservoir always was used in the prior art. In short, the Carnegie experts put themselves, and ask this Court to put itself, **in the position of savages ignorant of the use of a reservoir,** ignoring the fact that expert evidence, to be competent at all, must be based on expert knowledge of the prior art, knowledge which they absolutely ignore in the construction of the documents.

Absurdity of keeping vessel less than half-full.

If we can, as petitioner's expert witnesses and counsel concede, store our metal intermediate the producing furnaces and the consuming converters, how are we to do it? It might be argued from the position taken by petitioner and affirmed by the Circuit Court, that we should avoid infringement by keeping our reservoir less than half full of metal, but this, on analysis, is mere nonsense, for **if we keep our reservoir less than half full then it is simply as big again as it need be** and the process will be **exactly the same as that carried on in a vessel of half the size kept full.** It would seem then that the only possible course open to us in carrying out the storage of metal, which they tell us we are entitled to do. would be to provide two reservoirs, filling and emptying them alternately; but this would be a means of storing molten iron entirely different from anything taught by the prior practice or indeed suggested by

the prior publications. In fact the first suggestion of such an apparatus and method is contained in the Jones patent in suit; see paragrapa beginning line 31, page 874, in which Mr. Jones says:

> "*I find it in practice very advantageous to employ two or more mixing vessels* constructed substantially as I have described * * * My invention however is not limited to the employment of any specific number of such vessels."

It would seem then that to avoid Mr. Jones' patented method we must provide a plant of the character which Mr. Jones was the first to suggest and which he states to be *very advantageous* for the practice of *his invention*, and Mr. Jones is obviously right. The employment of two reservoirs would be a very clumsy and altogether useless device if it was merely desired to store the molten iron and to avail yourself of such incidental mixing as took place, but the two or more receptacles would be almost necessary for the practical carrying out of the Jones process of mixing to a standard composition. To secure by a process of mixing, metal of substantially homogeneous character, it is absolutely necessary, as Mr. Carnegie points out in his testimony, *to select* from the available metal, charges which will average up to the designed standard and, as Mr. Gayley and the other witnesses for the plaintiff have made clear, you cannot get a homogeneous product of metal, or anything like it, by running all the metal from the furnace into a reservoir and drawing from that reservoir as the metal is needed; obviously, however, if you have two or several receptacles you are in much better shape to utilize your produced metal as it comes from the furnaces for a charge which is unsuited for admixture with the metal in one mixer would naturally be better suited for admixture with the metal which happens to be in the other mixer. Mr. Jones says that the use of several mixers was in practice very advantageous. The above considerations will probably satisfy Your Honors that several mixers were in commercial practice absolutely necessary to the Jones process, and these considerations add to, what we venture to call the absurdity of the petitioner's contention which would drive us from the use of the old reservoir in the only way in which reservoirs have been used prior to Jones' invention and would compel us to instal apparatus first suggested by Mr. Jones in his patent and which apparatus in use, would be certain to give results much more nearly approaching the result which forms the sole stated purpose of Mr. Jones'

invention than anything which we have ever obtained or could ever obtain by the use of our reservoir.

In following the petitioner into a discussion of what might or would be the case *if* this were a patent for preventing sudden variations in silicon in pig metal as used in a Bessemer converter, we have departed from what we contend to be the true issue of the case, but as this departure has enabled us to show to your Honors, not only that the Jones patent cannot be infringed by any process which does not produce substantially homogeneous metal, and that Mr. Jones has disclaimed and distinguished from his invention such mixture as occurs as an incident to storage, but also that this disclaimer and distinction of mixture incident to storage not only was actually made by Mr. Jones, but was necessarily made by him, it is not without use and relates to matters which may be fairly considered.

In the Circuit Court our admission that the process used by us might be taken as an infringement of the Jones patent, except for the fact that our mixture is only such as occurs incidentially by storing the metal, and did not result in a substantially homogeneous product, seems to have been considered as though it implied that all the detail of our use was a part of Mr. Jones' specified and claimed method.

The metal which we dump into our reservoir is blast furnace metal; our reservoir is generally more than half full; the use which we make of our stored metal is to convert it into Bessemer steel. We have not argued that these facts prevent our method from being an infringement, therefore, apparently, the Circuit Court Judge assumed that these peculiarities of our use were to be considered as a part of the invention, and we were held to infringe the Jones patent, *inter alia*, *because* we used direct metal—*because* we kept our reservoir more than half full—*because* we used the stored metal in Bessemer converters. But we have shown to your Honors that none of these things are distinguishing features or limitations of the Jones' invention as specified and claimed. We have not contended that our use of direct metal distinguished our practice from Jones, because Mr. Jones' method unmistakeably covers the treatment of either direct or remelted metal. We have not contended that our practice of keeping our reservoir more than half full distinguished our use from the Jones method, because Jones' method covers any way of mixing metals to a standard composition in which

the mixing receptacle is not emptied. We have not contended that we escape Mr. Jones' patent because we Bessemerise our iron, because Mr. Jones' patent is in no wise limited on the use made of his metal after it has been mixed to a standard composition.

The Generally Large Residue in Defendant's Practice is not a factor tending toward uniformity or avoidance of abrupt variations in Silicon.

Before leaving the question of infringement, we think it best to call the Court's attention to the fact that the assumption of the plaintiff's witnesses to the effect that what is called the dominant pool is a factor tending toward avoidance of abrupt variations is an assumption not based upon, but contrary to the facts as proved.

We do not mean though that the mixing which is incident to the defendant's use of its reservoir does not result in the production of iron which varies less abruptly than the blast furnace metal as it comes from the furnaces, but we do mean that the variations in the processes carried on by respondent and petitioner are more frequent and more abrupt than they would be in the method of mixing concededly open to the public, in which mixing receptacles are alternately filled and emptied.

We have discussed this subject at length in connection with our presentation of the evidence as to "the Crying Need," because it formed part of the demonstration that the petitioner itself had abandoned the patented invention; and have also referred to it in considering the prior use of the Intermediate Storage Ladle in the Bessemer works, to which discussion it is peculiarly appropriate because the facts presented negative the reason given by the Judge of the Circuit Court for his ruling that this old practice was not an anticipation of the Jones invention. The matter is not directly relevant to the question of infringement because, as we believe we have satisfactorily shown, the so-called "dominating pool" is not only not an element of the process claimed by Jones but is absolutely foreign to his described operation. Nevertheless, as the Judge of the Circuit Court rested, not only the novelty of the patented invention, but its infringement, solely upon this assumedly important and distinguishing feature of the Jones invention, the point should be noted here because it shows how utterly

wrong the Circuit Court Judge was, not only in his construction of the patent and reasons for finding infringement, but also as to the facts relating to what he was misled into considering, the vital point of the case.

The facts which show that the use of the dominating residue did not tend to avoidance of silicon variations as compared with a process in which no residue was left in the mixer are briefly as follows:

First. Where a reservoir such as the defendant used is alternately filled and emptied, each charge of the reservoir provides twenty-five converter charges of absolutely identical composition, while in the continuous mode of using the reservoir there are variations in the composition of practically every converter charge drawn from it.

Second. The variation between successive charges of the reservoir in the method of filling and emptying it are no greater than are of frequent occurrence in the methods used by petitioner and respondant in which the reservoir is kept generally well filled up. This last fact is established in a very simple manner from facts introduced in the record by petitioner and by simply taking from the tabular records introduced by Mr. Gayley the figures which show the average variations in silicon which would exist in successive reservoir charges made up of the blast furnace metal, just as Mr. Gayley's record shows that it comes from the furnaces, and comparing the differences found to exist between the successive charges with the differences shown by Mr. Gayley's record exhibiting the variations in converter charges drawn from the mixer as the petitioner uses it. The result of this simple arithmetical computation is, as we have said, a demonstration of the fact, not only that the method of successive charging permits of only one variation for each twenty-five converter charges as against twenty-five variations in the continuous mode of using the reservoir but also that the variation taking place only once in twenty-five charges is no greater than the variation frequently taking place between successive converter charges in the continuous method.

The facts, above briefly stated, demonstrate that our mode of use of our reservoir is as our witnesses have always asserted, governed by our need of storage and adopted to our disadvantage not only as to the matter of uniformity of product but also as to the matter of avoiding abrupt variations in silicon.

Conclusion as to Infringement.

The matter of the construction of the patent, upon which construction the question of infringement depends, is a matter for the Court and not for the witnesses. It is, moreover, a matter which the Court must settle from an inspection of the document with, of course, such collateral assistance as is to be derived from the Patent Office proceedings and, where necessary, with the assistance of expert testimony as to purely technical matters. Knowing this to be the law, we have discussed the matters of construction and infringement on the lines which we believe to be pertinent and with little regard to what the witnesses have testified as to their understanding of the written paper, except so far as this testimony has misled the Judge of the Circuit Court and led him to adopt, as his construction of the patent, the testimony of Mr. Gayley as to the practice of the Carnegie Company, a modern practice which, as we have shown you, Mr. Gayley does not pretend to find described in the Jones patent.

In the brief filed in this court in support of the petition for *certiorari* petitioner's counsel express great surprise at the construction put upon the patent by the Circuit Court of Appeals, a surprise which we can easily believe to be unaffected because in their treatment of the case in the lower courts, petitioner's counsel have avoided the patent specification and the patent office proceedings as carefully as Mr. Gayley ignores the patent. Counsel also, in their brief, referred to the testimony of Mr. Morgan on page 396 where, in answer to × Qs. 57 and 58, he states that, aside from the fact that the defendant adds cupola metal to the blast furnace metal in the reservoir he does not recognize "a material difference" between the respondent's practice and that described in the second claim.

An examination of Mr. Morgan's deposition as a whole will show your Honors that he was throughout directing his testimony not to the construction of the Jones patent but to the proposition that the construction put upon the Jones patent by petitioner's experts was one which covered subject matter clearly anticipated in the prior art. Mr. Morgan never admitted that the respondent mixed to a uniform composition and in his answer to ×Q. 58 immediately preceding the passage quoted in petitioner's brief, he described the respondent's practice as follows:

"In the language of Mr. Holley, our practice may be described as that of *storing, mixing and pouring from the reservoir, the mixing being incident to the reservoir.*" *ante of the*

If Mr. Morgan is to be assumed to be correct in his so-called admission of infringement it would certainly be most unfair to exclude from consideration his *statement made in the same answer* to the effect that the mixing secured by the respondent is only such as is incident to storage, and if this statement be accepted you are brought face to face with the proposition that the construction contended for by petitioner and admitted by Mr. Morgan make the second claim cover the precise subject matter which was eliminated from Mr. Jones' application on reference to prior application and as a condition of the grant of his patent for a process of mixing to a uniform composition.

Every assertion or admission of infringement necessarily involves a construction of the patent. In Mr. Morgan's case the construction was not implied but expressed, so that there is no possible ambiguity about his so called admission, and as contrasted with his here assumed construction of the patent to the effect that it covers the storage of molten metal with merely incidental mixing we have not only the estoppel manifested in the Patent Office proceeding but we have what is practically the testimony of Mr. Jones himself to the contrary. We refer to the deposition of Mr. Carnegie, reviewed ante pp. 39–41, wherein Mr. Carnegie gives not only his own understanding of the practice as originally introduced but the explanation of the method made to him by Mr. Jones, showing absolute accord with the Patent Office proceedings that the invention was solely for a process of mixing to a uniform composition as contrasted with and distinguished from the mere storage of the metal with incidental mixing. If, therefore, your Honors are to be influenced by the understanding of witnesses as to the true scope of the patent, the testimony of the greatest steel manufacturer in the country and the owner of the patent as to his and the inventor's understanding of its true scope is certainly to be accepted rather than Mr Morgan's so-called admission when testifying as to what was really the question of the relationship to the defendant's practice of the prior state of the art.

The Crying Need.

Though the mixing method of Jones might have had advantages in producing uniform product, it was comparatively unimportant and was abandoned by the petitioner, the great need of Bessemer art being for storage reservoirs, and this need increased in the early 90's because of the great increase in blast furnace output.

The Circuit Court found that the crying need of the steel trade at the time of the Jones invention was for a mixing method to give more regular product of blast furnace metal for use in converters. These catching words, "crying need," would indicate that Jones supplied the solution of a problem staring steel makers in the face. The facts shown by the record are, however, at variance with this, as we will now show.

Blast furnace metal has been used abroad since the early times of Bessemer, extending back to 1857 in Sweden and other places (p. 764). At Givors, France, it was stated (p. 755) that the firm had two furnaces and that the iron was of such a regular quality that there was **not the slightest difficulty in making ingots of an even quality** of metal direct from the blast furnaces. Mr. Snelus, of Workington, England, in 1876 described their work in using direct metal and stated (p. 780) "that the quality of steel made from the blast furnace was **certainly better** than where the iron was melted in the cupola."

Mr. Smith, manager at Barrow, where they had 14 blast furnaces from which they took the metal for direct use, stated to the British Iron & Steel Institute in 1876 that they were using in converters about 1500 to 2,000 tons per week with great success, and that it had the advantage in leading to a better and **more regular running** of their blast furnaces (p. 786), and the President of the Society, who was connected with the Dowlais Works, stated (p. 787) that the practice was working admirably, that a considerable saving was effected and that it **did not interfere in any way with the quality of the steel.**

As indicating the run of blast furnace metal in England we find that Mr. Williams, of the Bolckow-Vaughan Works, in 1874 stated (p. 755) that he had "for three or four years been making steel very successfully—many thousands of tons—from pig iron pro-

duced from a single blast furnace, which scarcely or never varied so as to make difficulty. The steel so made was, he felt sure, **equal to anything produced** in the best Bessemer works in England."

The evidence in the American Works, including petitioner's **especially in the early 90's,** points to this same fact. As shown by Holley (p. 845) and above commented on, the American furnace practice had not been so regular, and they were not ready in 1877, even with the use of a storage and mixing reservoir, to use the metal direct.

In later years, however, this had much changed and Mr. Wood, the President of the Marylnd Steel Co., states (p. 172):

> **"Furnaces have been and are run giving iron as nearly uniform in different parts of the same cast and in successive casts as is drawn from the cupola, operated as is usually the case in the larger works."**

Petititioner's witness Gayley in 1893 read before the British Iron & Steel Institute and the American Society of Mechanical Engineers at the Columbian Exposition, an exhaustive article on "The Development of American Blast Furnace with Special Reference to Large Yields" (pp. 1065 to 1116), and indicated the quality of the metal as then produced for direct use by the statement (p. 1078):

> **"The suitableness of the metal for this 'direct process', as we term it, will be appreciated from the fact that under the rigid system of foundry grading—by the fracture—the average percentage of Nos. 1 and 2 grades from all of our furnaces for the first five months of this year was 95 per cent."**

The Nos. 1 and 2 grades are the irons uniform in silicon and his statement is that 95 per cent are suitable for the direct process.

Capt. Hunt (p. 307) says that "great progress has been made "in blast furnace practice, so that under normal conditions the **"metal can be held very uniform."** And again (p. 321) "The in- "telligent blast furnace manager is not ignorant of the quality of "the metal he is producing", telling us that thousands of tons of good steel has been made from such metal.

Robeson states that in 1893 silicon could be kept within .5 or .6 per cent., and that in 1892 their furnaces at Pottstown had been run for weeks at a time within .3 per cent. variation (p. 353).

Morgan, defendant's engineer, after reviewing the whole subject, says, (p. 377):

> "On the other hand, modern furnace practice has so increased the regularity of the iron output as to its chemistry, that we should **count upon blowing nine heats of every ten without much difficulty,** so far as heating elements are concerned, and with a far less loss from irregular quality of metal than from a practice which prevents accurate measurement of heats, in so far that for this use a reservoir might be dispensed with for much direct work."

This petitioner used direct metal successfully for five years, and the Illinois Steel Co. for ten years and it was not until 1892, and then for the main purpose of reservoiring the metal that the Illinois Company put in a storage tank (p. 263).

Though petitioner erected the Jones mixing vessel at Edgar Thompson's in 1887, no other works followed them in the practice of the Jones invention, and they ran their Duquesne works from 1890 to 1897 without installing a reservoir, making at least 2,000,000 tons; and ran their Homestead works from about 1887 to 1897 without such vessel, making 1,696,037 tons (p. 591). The saving at 65c. per ton (their claim) would be about two and a half millions ($2,500,000). If there was such a saving can it be doubted that a man of Carnegie's wealth would not have made the change?

The need is now for Reservoirs.

One difficulty in running the metal direct without the reservoir was in the irregular weights of metal carried by the separate ladles, Some ladles would be filled higher than others, and in some a thicker scull would be formed, and there was no accuracy of weights, so that the exact amount of recarburizing metal to be added to bring the steel to the proper carbon could not be known, and short ingots would be formed making short rail lengths (pp. 263; 377; 160),

Another difficulty was that the metal in the separate ladles holding comparatively small amounts and being exposed, would chill more rapidly than that stored in a great big tank where the heat of the mass was kept up.

The main reason, however, was the difficulty of running the blast furnace plant and the converter plant together, which increased much in the early 90's on account of the great increase

in the product of blast furnaces. Blast furnace taps were at intervals of from 4 to 6 hours; the metal was required for the converters about every 20 minutes; and it was impossible to keep the right amount of metal stored in ladles, considering the delays which might occur in the converter works or rolling mills, or to maintain supply in case of delays of the furnaces. The **large reservoir by providing for storage acted as a balancer** between the two and made them **practically independent** in their operations. It provided a place for the metal when the converters were not ready to receive it; it provided a supply to draw upon if no furnaces were ready to tap.

That such reservoirs were old is shown throughout the case, acknowledged in the opinion of the Circuit Court (p. 692; 698-700; 704), and specifically found by the Appeal Court to have been admitted by Jones in the prosecution of his application (p. 1119-20). We therefore think it unnecessary to more than refer to the evidence.

For Cupola Metal: Whitney's reservoir; the accumulating ladle described as a reservoir by Hunt (p. 820) and by Holley, Vulcan Works (p. 797; by Snelus (p. 757); Kirk (p. 825); petitioner's witness Metcalf (p. 626).

For Blast Furnace Metal: The Tabberner patent (p. 964); Holley, Vulcan Works (p. 797); Snelus (p. 757 and 789) connecting the cupola reservoir directly with its use for blast furnace purposes to maintain the supply and get a better mixture; and throughout the Holley 1877 report, describing the immense open hearth furnace (p. 833)—the 20-ton covered ladle to store, mix and pour the blast furnace metal (837)—the coal-fired furnace to "store and keep hot some 60 tons of iron from all the blast furnaces", referred to as the best means of mixing metal so as to get a more uniform result (p. 842)—and finally describing the storage of a large quantity of iron in a reverberatory furnace or other reservoir (p. 845). Also the Witherow Patents (p. 941-46).

The Great Output of Late Years Made Reservoirs Necessary.

In the early 70's the usual output from blast furnaces was 50 tons. This increased greatly, Gayley, petitioner's expert, saying in his article above referred to (p. 1078):

> "In the period covered by the last decade there are three steps in the development of American blast furnace practice that might be mentioned; first, in 1880, the introduction of

rapid driving with its large output and high fuel consumption. Second, 1885, the production of equally large amount of iron with a low fuel consumption by slow driving; and third, in 1890, the production of nearly double the quantity of iron on a low fuel consumption through rapid driving."

Morgan states (p. 379):

"It is apparent to the engineer that with the growth of production of furnaces from fifty tons a day in 1872 to 400 and 600 tons in 1895, **all apparatus is necessarily increased in size or capacity,** which is adequately proportioned for the work to-day."

The capacity of converters was increased in the same way as stated by Forsythe (234) from 5 or 6 tons in 1872 to as high as 18 in 1895 or 1896.

The present respondent in 1885 made 166,525 tons of Bessemer ingots; in 1895 it had doubled its output and made 326,570 tons. Its own output of Bessemer pig metal in 1885 was 149,442 tons, cast into pigs and remelted, and in 1895 was 317,829 tons, used direct for making Bessemer steel. (Diagram opposite p. 426). Instead of a few tons at a tapping, blast furnace casts had run up to 50 or more tons (the output of defendant's furnaces being 1,500 or 2,000 tons per day) and the transfer ladles up to 20 tons.

The great problem was what could be done with this mass of metal; how to hold the metal molten until needed, as well as how to obtain proper weights of converter charges and so provide for proper recarburizing and prevent short ingots and blooms or the making of short rail lengths, causing much scrap and loss.

It is not surprising that manufacturers in the early '90s went back to the old reservoring idea, advocated by Holley in 1877, and did just what he stated, put in an immense furnace or reservoir tank which would receive and hold this metal. Mr. Morgan states as to this, (p. 378):

"From these considerations, as an engineer, I consider that the direct process to-day, for its regular working, depends much more for its success upon the storage reservoir and its further function of exactly measuring heats than upon the mixing incidental to storage."

The Reservoir Was Used as Other Well Known Reservoirs.

The vessels have not been used on the lines marked out in the Jones patent, to obtain standard composition as the patent sets forth,

neither have they been run in the way petitioner claims is covered by the patent, that is, by maintenance of a dominant pool or mass of metal to give gradual variation. President Wood, of the Maryland Steel Co., said (p. 166) "not infrequently the receiver was entirely "empty, the fluctuations in quantity remaining in the receiver were, "however, very great." See also Cabot, (p. 151, Q. 26, 27); Morris, (p. 156, Qs. 12, 13, and p. 158, Q. 30.) This fits in exactly with respondent's practice where the metal in the reservoir fluctuated ac-according to supply and demand.

The similarity in the operation of these reservoirs and the ordinary water supply reservoirs is apparent. A sufficient supply is kept in reserve to ensure supply when needed, just as in the city reservoir when the supply becomes low, in case of drouth, notice is given to prevent over-waste of the water. The same character of reservoir is used in all paper mills to maintain a supply of paper pulp; also in breweries to maintain a supply of the partially made beer or ale; another example being the large wine vats used abroad, such as the great *Thun* in the castle at Heidelberg.

From the above the necessity of the reservoir is made clear, and it is seen that respondent's have used it as other reservoirs are used without reference to the amount in it, simply as a balancer between the furnaces and converters, its tremendous capacity of 300 tons being a necessity to maintain the supply on account of the large casts coming from the different furnaces.

Petitioner has Abandoned the Jones Method, and Employs its Vessel Particularly for its Reservoir Function.

If petitioners used their vessel to carry out the patented Jones method they would select the metal to mix to average uniform composition as marked out by the patent and described by Carnegie, and would obtain substantially uniform metal for converting or other use. They acknowledge that this is not their practice, and that they do not aim to obtain uniformiiy, but only gradual variation between successive converter charges, the metal varying widely in metalloids at different times during the day. Even if they employed the vessel to give gradual variation, which was held by the Circuit Court to be the invention of the patent, it might be urged that though they were mistaken in their idea, they were in good faith trying to follow what they thought was Jones invention.

Where, however, it appears that the successive converter charges coming from the vessel, *fluctuate violently*, and are beyond any such thing as the uniformity actually called for in the patent, or even the gradual variation which petitioner's witnesses picture, some other reason must be sought to explain why they go to the trouble to charge their metal into the big vessel. Considering these violent fluctuations, and also the large number of furnaces, and the large output, the fact is that their main advantage is in the very reservoir action so shown to be old, and shown to be the advantage sought for by defendant and other large steel makers.

Petitioner's witness Gayley (p. 559) in showing how the gradual variations in converter charges would be a guide to the converter man, tells us that successive charges should not vary more than one tenth of one per cent. (.10%). Mr. Metcalf tells us (p. 638) that if they varied .25 up or .25 down "such a change would have played the mischief with us", and that a variation of .50 per cent. would be disastrous, and a variation of .25 would be very troublesome. The reason for this will appear when it is understood that a variation of, say, .25 per cent. would be equal practically to a variation of .50 per cent. because the scrapper would not know whether it was up or down, and could not know whether to add or deduct from the amount of cold scrap metal put in the converter.

Abrupt Variations in Petitioner's Mixed Metal.

But the actual use of Carnegie's metal reservoir,—the abrupt variations between successive charges, some of these up, some down,—conclusively show that they did not obtain any fair guide to the scrapper nor any substantially uniform metal, and therefore that the supposed advantages of the patent are not obtained, the only advantage being in storing or reservoiring the metal. Examples of the irregularity of silicon in the different converter charges are clearly shown in the record quoted by Mr. Gayley (p. 593, 595).

On Aug. 6, 1893. there were variations of .18 per cent. or 18 points upward, (that is, an increase in silicon of $\frac{18}{100}$ of 1 per cent. of the metal). This was followed by a violent drop of 60 points at a later period, On the same day there were successive steps upward, followed by a violent rise of 24 points, then a drop of 16, and then a drop of 24. On Aug. 7, there was a drop of 37, then of 19, then a violent rise of 37 and next a drop of 18. Again a rise of 46, a drop of 23 followed by a drop of 24 and an abrupt rise of 30. On Aug. 8 there was a drop of 51, followed by a rise of 47; again a

FOLDOUT(S) IS/ARE TOO LARGE TO BE FILMED

drop of 28, followed by a rise of 33; a drop of 23 and then again 32, a rise of 37 and a fall of 40. The same fluctuations appear throughout the record, showing that the supposed gradual variation to act as a guide to the converter man was not obtained and could not be relied upon.

The accompanying diagram gives a good picture of the character and extent of the fluctuations occuring on these days.

By referring to the tabulated analysis of silicon in successive charges printed in the record at pp. 994 to 1044, being the records of the petitioner's analyses for the months of June, 1893, and April, 1894, and therefore giving another fair sample of their practice, you will find that the varations indicated above are by no means unusual. For example, p. 998, the difference between samples Nos. 5339 and 5341 is .41; on page 1000, the difference between samples 5518 and 5520 is .49; on the same page the difference between samples 5538 and 5540 is .66; on page 1003 the difference between samples 5753 and 5761 is .47; on page 1004 the difference between samples 5860 and 5862 is .51; on page 1005 the difference between samples 5966 and 5968 is .61; on the same page the difference between samples 6004 and 6003 is .95; and the difference between the adjacent samples 6003 and 6007 is .86; on page 1006 the difference between samples 6039 and 6041 is .41; on page 1008 the difference between samples 6242 and 6244 is .67, and so on, almost every page of the record showing variations exceeding .40, differences of .74 being indicated on page 1018, of .79 on pages 1023, page 1028 showing seven instances of variations exceeding .40, one of them being as much as .79.

That there was an **incidental evening up** of the metal to some extent goes without saying, but it was not a snfficient evening up of the metal and did not produce sufficient uniformity even to act as a guide to the converter man.

Batch Mixing Compared with Reservoiring.

The Judge of the Circuit Court *assumed* that the so-called dominating residue was a factor in giving more gradually varying metal for Bessemerizing than where the vessel was filled and emptied. In this he is mistaken, as we will now demonstrate, and it proves, as we believe beyond doubt, that the petitioner, like respondent, uses its vessels on account of the advantages of reser-

voiring, as above pointed out, all attempt to obtain the uniform composition called for by the patent being abandoned.

The fact is, as Your Honors, if you had the time and patience, could verify from the tables showing analysis of Carnegie blast furnace metal, that, where the metal to be mixed is not selected for the purpose of making a mixture of standard composition, better results with regard to the mixture can be obtained by charging the mixing receptacle from a number of different furnaces without utilizing any residue whatever. We say better results, because, while variations in the composition of the different charges of the mixing receptacle will undoubtedly occur, these variations will not be any greater than constantly occur in practice in the defendant's works by the use of their mixing receptacle as they use it; and because such variations will not occur so frequently as they do by the respondent's present practice, this being so, because each charge of the mixer is, of course, of uniform composition, and will provide a proportionate **number of converter charges of identical admixture.** It results from this, and we will show you that our statement is **absolutely** correct, that the presence of a residue in such a mode of using a reservoir as that of the old intermediate ladle, and as that **now followed by the respondent company is not a factor tending toward uniformity,** or even a factor tending toward the avoidance of abrupt variations, its real **utility is solely in that it provides a reserve of metal,** and it is used because the reserve of metal is an obvious necessity to enable the plant to be run consecutively,— and to weigh out full heats,— and, because, indeed, it is practically impossible to handle these large masses of metal without having a residue.

Possibly if the molten metal to be charged into the mixing receptacle was, as Mr. Jones unquestionably intended, selected metal, a not too large residue of the standard composition might be useful, as Mr. Jones says it is useful, for this purpose, but, obviously, where the metal is not selected and where the residue is not of standard composition, it is quite as likely to be a factor tending toward the variation from the desired standard, as it is to be a factor tending toward such a standard.

We have in the Record, on page 29, a record produced by Mr. Gayley, which in one column purports to give the silicon contents of consecutive casts from the blast furnaces, and in another column

MAP(S) IS/ARE TOO LARGE TO BE FILMED

a statement of the silicon contained in alternate ladles drawn from the mixer; these silicon contents in themselves representing, as Mr. Gayley says in his answer to Q. 9, "an average day's showing." The later exhibits, showing the variations of silicon, above referred to demonstrate that it was decidedly better than an average day's showing with regard to the efficiency of the mixer in equalizing silicon. But for present purposes it will answer well enough.

The exhibit shows variations in the silicon from 1.07 to 1.75, or a difference of 6% between the highest and lowest silicon showings. It also shows between the second and third ladles a difference of .51, and between the third and fourth ladles a difference of .42. The above are the result of the Carnegie Company's ordinary way of working, and show that decidedly abrupt changes of silicon are liable to occur and that the variation from uniformity is very great.

Now, supposing that instead of working with a large residue like petitioner, we alternately filled and emptied our big reservoir with metal taken just as it is drawn from the blast furnaces. In the first place, the result of this would be that we would have in each filling a mass of 300 tons of molten iron of absolutely uniform composition. This quantity is about equal to 25 converter charges; we would therefore draw off from the mixer 25 charges of identical composition, as to which the converter man would have nothing to do but treat 24 in exact accordance with the way he had discovered to be best for the first.

He would only have to look for variations between the last charge drawn from the mixer and the first charge of the next batch mixed in it. How much would this variation be likely to be? This can be readily ascertained from Mr. Gayley's tabular statement, showing the silicon in consecutive casts from the blast furnace. Our 300-ton reservoir is filled by dumping into it about ten furnace taps of the molten metal.

If then we take the silicon analysis in groups of ten we would have the following figures representing the silicon contents of successive charges:

1.67
1.33
1.30

Or if we take the silicon analysis in groups of five we will have the silicon contents of each charge represented as follows:

1.72

1.62
1.37
1.30
1.33
1.30

It is quite obvious from the above computations that the advantage with regard to the avoidance of sudden variations in silicon is decidedly in favor of the method of alternately filling and emptying the mixer as against the respondent's and petitioner's present practice of using their receptacle as a [illegible] and keeping it well filled up with metal.

The tabular analysis of furnaces, printed [illegible] 1047 *et. seq.* is unfortunately not in condition for convenient study, owing to the fact that the analysis of silicon given are not tabulated in the order in which they are taken, as is clearly apparent from the time at the left hand margin of the page. We have had these analyses regrouped in the order of time and then averaged up in groups of ten with the result indicated in the following column:

1.61
1.58
1.20
1.18
1.35
1.29
1.06
1.38
1.26
1.49
1.63
1.70
2.10
2.07
1.80
2.10
2.01
1.58
1.58
1.45
1.53
1.55

1.60
1.68
1.57
1.39
1.77
1.45
1.53
1.57

Your Honors will observe that only in two instances is the difference between successive hypothetical charges of the reservoir as much as .40, in the one case being .40 and in the other case .43. The average variation is certainly not greater than the variation between successive converter charges as drawn from the mixer worked in the usual way. The advantage of having approximately 25 converter charges of identical composition manifestly makes the method of filling and emptying immensely better and more convenient from the converter man's point of view than the regular way of working. The accompanying diagram gives a comparison of batch mixing as compared with reservoir action.

The above facts prove to a demonstration, we believe, that the petitioner in keeping its vessel practically full is simply using all the storage capacity which its vessel provides and is throwing away the advantages which it could have by using its two vessels as mixers instead of reservoirs and charging and discharging them; so showing that even with petitioner the necessities for reservoiring the metal control rather than the necessity for more uniform composition.

Practical Results of Petitioner's Practice.

The practical results obtained at the Carnegie works also show this fact. The main test is the output of seconds or imperfect rails: and finding difficulty in this regard, in order to have it corrected, Mr. Robeson, a special metallurgical engineer, was employed in 1893 (p. 347). He had worked there in 1885 and 1886 when they were using the blast furnace metal without the reservoir and states that the practice in 1885 and 1886 was more regular than that in 1893. As to the latter he tells us that the blowing was "the most irregular of any that I ever had seen" (A. 48, p. 356); that their weekly average of seconds was up to 8½ per cent. and he had known them to reach 16

per cent. At that time he visited other works not using the mixer and found their percentage of seconds considerably lower than that at Carnegie's (p. 350).

Side blowing of the metal in the converter was a destructive practice, burning up the iron to obtain heat, and arising from irregularity of the converter charges, such as from over-scrapping, and he tells us that, at times, fully 90 per cent. of the charges were side blown (p. 332).

When the necessity for storage above shown is made clear, and the actual facts as to petitioner's practice are thus disclosed, the claim that Jones had made a great invention and improvement in the art of making Bessemer steel, which made practical the use of direct metal by giving such gradual variation in successive converter charges as to act as a guide to the converter man, grows to be a farce.

If anyone would naturally use the invention to the best advantage it should be the petitioner, the owner of the patent; and where his own records show that the advantages claimed did not exist, we submit that the whole case should fall.

Especially is this the case where there is no proof that respondent by the use of his reservoir attains the alleged gradually varying product of the supposed Carnegie practice read into the Jones patent, there being no evidence as to how regular or irregular its converter charges are, or that the incidental mixing of the metal is an aid in Bessemerizing, the evidence simply showing that it uses the vessel only for its reservoir action.

The fact that petitioner by following the same practice as respondent does not obtain even gradual variation in successive converter charges, conclusively negatives the charge of infringement. Petitioner has said that by following this Jones process it obtains gradual variation, and because respondent uses the same process it must have the same result. But the above facts show that petitioner itself does not obtain even what they call gradual variation. There is therefore no proof that respondent obtains it and no proof of infringement even under petitioner's fine spun theory,

The Circuit Court and the Circuit Court of Appeals have held that the reservoir action was old and known before the Jones invention and is open to anybody. The record shows that on account of the large output in late years from large blast furnaces, such

reservoirs became an actual necessity in large works having their own blast furnaces. **If petitioner's proposition is sustained, it means that this respondent cannot use a reservoir in the way that reservoirs are naturally used for storage of metals, though they were known years before the Jones invention.**

Where the real intent is as above shown, to store the metal, to keep it hot and prevent sculling and to give proper weight to the converters, so balancing between furnaces and converters, and this was the particular thing needed when respondent erected its plant, we submit they cannot be restrained from using it.

ANTICIPATIONS.

The Prior State of the Art and Herein of Anticipation.

It was common in the art prior to Mr. Jones' invention to store molten pig metal in reservoirs so as to mix the same and produce a more uniform metal. This prior art is proven partly by patents and publications, and partly by proofs as to prior uses in this country, which either fully anticipate the patent or show that there was no scintilla of invention in it, and especially show that it would be impossible in view of the prior art for the patent to cover respondent's practice, because its practice is identical with some instances in the art so disclosed.

In the order of dates the Whitney car wheel practice comes first, and it is believed to be a clear anticipation of the method of the Jones patent, as it sets forth the practice therein described, *even to mixing, having for its object* the securing of metal mixed to a *standard uniformity of composition*, while the proofs show affirmatively that this result was attained.

Car Wheel Practice.

The practice at the Whitney Works, which may be typical of the car wheel foundries, involved the use of three cupola furnaces, a large tipping reservoir and a plant of casting ladles. The practice was to run the metal from all of the cupola furnaces into the reservoir ladle until it was nearly full, then to begin pouring out

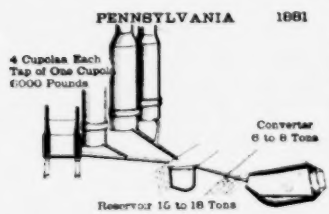
charges into the casting ladles while still continuing to pour metal into the ladle from the furnaces, the ladle being kept approximately full during the whole period of working until at the end of the day when the furnaces ceased to produce more metal and the ladle being then emptied to be refilled on the following day.

Uniformity in the composition of the iron used in the manufacture of car wheels is of the greatest importance, and this uniformity was secured at the Whitney Works first, by a careful selection of the pig iron charged into the cupola furnaces or, so to speak, mixing the iron dry, and, second, by mixing what was still the ununiform product of the cupola furnaces in the intermediate reservoir. The reason for and the nature of the mixture of molten metal is explained by Mr. Whitney at considerable length, but for the present purposes is sufficiently indicated in his answer to Q. 9, page 117:

> "A. As the mixture was charged into each cupola, as I have stated, it was made up of irons from various furnaces, some iron having one quality and some another. As it is melted in each cupola, it did not all melt at the same time, and if we had drawn it directly from the cupola into the small ladles from which we poured the wheels, one wheel might have been poured out of very hard iron, another wheel out of very soft iron, and so every shade between. There would have been no uniformity in our work. But by taking it from the three cupolas, all melting the same charges of iron, and collecting them in a molten state, the **inequalities of melting were all overcome and a uniform product produced.**"

The evidence with regard to the Whitney practice we will review at length in a later portion of our brief; for present purposes it is sufficiently indicated above.

American Bessemer Intermediate Ladle.



Besides the evidence as to the car wheel usage the only other prior use proved by the evidence of witnesses, as distinguished from publications, to which we think it necessary to call the Court's attention is, the usage at all American Bessemer mills of what is known as the intermediate ladle. This was a large receptacle into which, in all the Bessemer mills, the molten metal was dumped from

the cupolas producing the same, and from which the charges from the converters were drawn, the intermediate ladle holding considerably more than the amount of metal necessary to charge a converter and being used, as the evidence shows, partly, because of its function as a storage reservoir, and partly, because of its function in *mixing and to a certain extent equalizing the character of the metal delivered to the converters.* This intermediate ladle use was, for all practical purposes, just such a use as the respondent makes of its intermediate reservoir and did not result in the production of substantially homogoneous metal.

Kirk Publication.

Considering next the old methods described in publications, the Kirk publication, to which Mr. Jones was referred in the Patent Office, and which he distinguished from his invention and disclaimed, is shown on pages 822-825, and is for a method of mixing iron

from a cupola furnace in which a quantity of the molten metal was kept in an intermediate ladle into which ladle all the iron was run, and from which the mixed iron was poured into the casting ladles. Like the Car Wheel practice and the Bessemer Ladle practice, this Kirk publication describes a usage in which a residue of metal was stored and used as a component of the mixture brought about by the running of all the iron produced into this reservoir. Mr. Kirk does not state whether the mixture effected was to a determined standard, as in the case of the Car Wheel foundries, or whether it was only such mixing as necessarily occurs incident to storage.

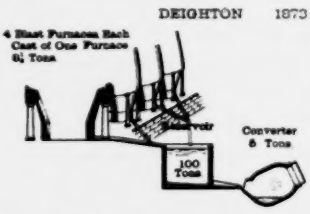
All of the instances of storing and mixing mentioned above, related to the treatment of molten pig metal remelted in cupola furnaces. This is an absolutely immaterial fact from our point of view because, for the reasons we have given (see pages 68 to 71) we understand that the Jones method is not limited to the treatment of iron drawn directly from the blast furnaces, the reasons being, *first*, that no such limitation can be put upon the patent by any proper construction of its language, and, *second*, that as the direct and remelted metal is essentially the same metal the process is the same process no matter to which it is applied.

Tabberner Patent.

But even if any possible distinction would be drawn between the similar treatments of direct and remelted metal Jones was not the first to see the applicability of the mixing process to direct metal. Thus as early as 1856 a British patent was issued to one *Tabberner*, (see Record pp. 963 to 965), Mr. Tabberner describing in his specification a plant consisting of a number of small blast furnaces for making pig metal arranged in connection with a large reservoir into which all of the furnaces delivered the pig metal as they produced it and from which reservoir the iron was drawn for use. With the exception that the defendant uses a number of large smelting furnaces their plant is precisely such a plant as is described by Tabberner and their usage practically the same; doubtless therefore, the mixture which occurred in Tabberner's large reservoir was precisely such a mixture as occurred in the defendant's large reservoir.

Deighton Patent.

In the year 1873 a British patent issued to one *Deighton* (see record pages 982-7). In his specification Mr. Deighton described a plant consisting of a number of blast furnaces for making iron, his drawings indicating the presence of four, and in connection with this group of furnaces, he describes and shows in his drawing a large reservoir into which all the metal from the blast furnaces was delivered and from which was to be drawn, as required, the pig metal necessary to supply a Bessemer converter which Mr. Deighton describes and illustrates in his drawing. The purpose of Mr. Deighton's reservoir, as he describes its use, was to obtain "*a better average of metal which will be more suitable for making Bessemer steel or metal* **of uniform quality**" that is to say, Mr. Deighton's expressed object would seem to have been the same as Mr. Jones' in that he sought the production of "*metal of uniform quality.*" But Mr. Deighton's treatment of his blast furnace metal in his reservoirs was presumably the same as the respondent's treatment of its metal in its reservoir. Such a treatment we know, while it doubtless gives metal of better average quality, does not



produce metal of uniform quality and therefore while Deighton's process had for its object the *better mixing* of the metal it was yet, as far as it appears, just the same practice as the respondent's whose chief object is *to store* its metal hence we must admit it is not to be presumed that Deighton obtained any better metal than the respondent obtains.

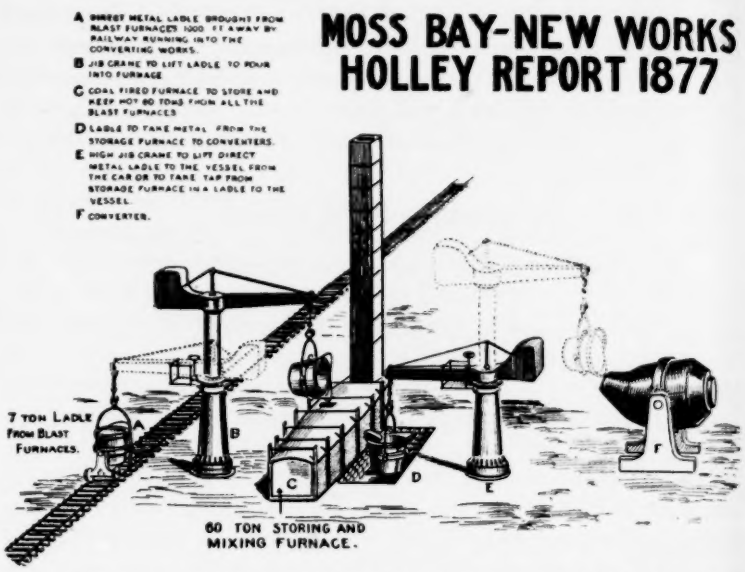
Holley 1877 Report.

Another publication describing the mixing of metal drawn directly from blast furnaces, is *The Holley Report*, (printed on pages 832, *et seq*,) Mr. Holley being the leading American authority on the manufacture of Bessemer steel, and employed as a consulting engineer by the leading steel companies, including the Carnegie Co. and the defendant company. The report which was made in the year 1877, is addressed to his clients, and is devoted, first, to a description of the practice abroad, and particularly in Great Britain with reference to the treatment of metal drawn directly from the blast furnaces in converters, the second purpose of the report being to advise his clients as to what, in the then condition of the American trade, it was advisable for them to do with regard to introducing the use of direct metal in their works. For the evidence of the experts called for respondent as to this report, see Durfee, p. 233; Forsyth, p. 275-7; Hunt, p. 300-3; Morgan, p. 380-3.

Moss Bay Plant.

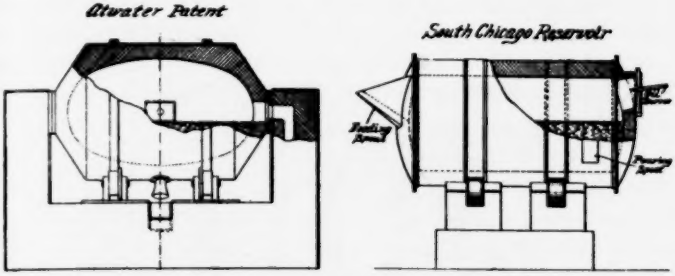
The first portion of this report, to which we desire to call attention, is that printed on pages 841 and 842, under the title "*Unfinished Work.*" Mr. Holley here describing the Bessemer works he had seen at Moss Bay in England in an unfinished state, but, as he says, "nearly completed." This plant, as he explains, was designed to embody either a single **sixty ton reverberatory furnace,** or else **two forty ton furnaces,** furnaces being designed as reservoirs into which all the metal from the blast furnaces was to be dumped and kept hot, and from which stored mass of molten pig metal the supply for the converters was to be drawn. Several handlings of the metal by cranes are described, and commenting on the structure, Mr. Holley says:

> "Although this large furnace may be the *best means of mixing metal so as to get* **a uniform result,** the complex manipulations due to the arrangement described seem likely to take an unnecessary amount of time and labor."


MOSS BAY-NEW WORKS
HOLLEY REPORT 1877
A DIRECT METAL LADLE BROUGHT FROM BLAST FURNACES 1000 FT AWAY BY RAILWAY RUNNING INTO THE CONVERTING WORKS.
B JIB CRANE TO LIFT LADLE TO POUR INTO FURNACE
C COAL FIRED FURNACE TO STORE AND KEEP HOT 60 TONS FROM ALL THE BLAST FURNACES
D LADLE TO TAKE METAL FROM THE STORAGE FURNACE TO CONVERTERS.
E HIGH JIB CRANE TO LIFT DIRECT METAL LADLE TO THE VESSEL FROM THE CAR OR TO TAKE TAP FROM STORAGE FURNACE IN A LADLE TO THE VESSEL.
F CONVERTER.
7 TON LADLE FROM BLAST FURNACES.
60 TON STORING AND MIXING FURNACE.

Holley's description is that "in this furnace it is the intention to **store and keep hot some 60 tons** of iron from all the blast furnaces." This indicates a large storage maintained or kept in the furnace, while we find that Holley comments on the tapping of the furnace, saying "it is going to be a somewhat difficult matter to stop the tap-hole of a furnace with 50 tons of fluid behind it," so showing *intentional storage and holding of remainder* so that there there can be no doubt that where the custom was to tap the furnace only every 6 hours, and metal was needed every half hour for the converters, the fresh molten metal would necessarily be poured into the pool or body of metal in the furnace. It is also to be noted that it is in regard to this practice that Holley refers to "the storage of a large quantity of iron in a reverberatory furnace or other reservoir" (p. 845), and the mixing of irregular irons on a very large scale", and states that "should there be any trouble about stopping the tap-hole in a large storing furnace it would not be a very difficult or expensive matter (considering the Pernot revolving hearth principle) to tip the whole hearth enough to pour a charge." (p. 846.) The Pernot patent (p. 925) shows this furnace, and the Atwater patent (p. 930) shown also in the accompa-

nying cut makes clear Mr. Holley's meaning. The similarity to the South Chicago reservoir heated by an oil flame is apparent at a glance.



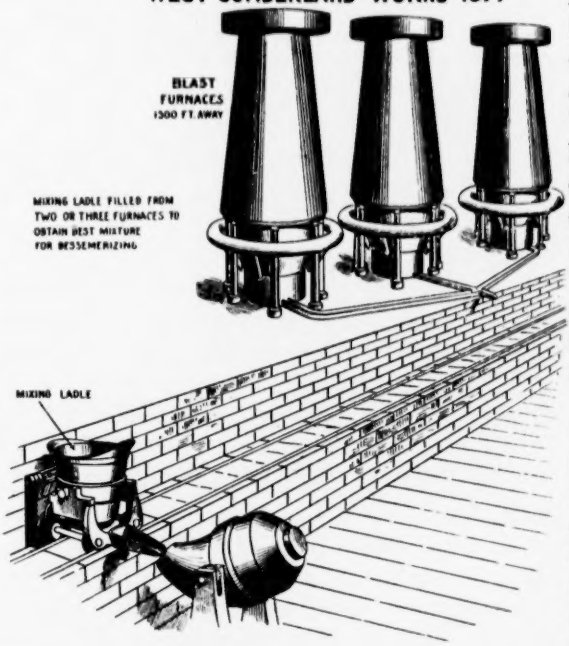
The Moss Bay plant was therefore designed to provide large storage, (60 to 80 tons,) to mix the metal to obtain a more uniform result; and this was accomplished by charging the blast furnace metal as it was produced into the storage furnace, the object being the one now claimed by petitioner to be the Jones invention, to give better metal for Bessemerizing; and while, as shown by experience in later years, the practice would probably not have given a uniform mixture, it would give a less abrupt fluctuation because of the incidental mixing in the chamber, and it was undoubtedly the same as respondent's practice. It is even to be noted that Holley recommends the tipping reservoir such as respondent employs.

West Cumberland Practice.

The next portion of Mr. Holley's report to which we desire to call attention is that having the caption, "*The West Cumberland Practice.*" This company was at the time of Mr. Holley's visit making iron exclusively by the so-called direct process, Mr. Snelus being the general manager of the works. The practice of West Cumberland is described on page 835, as follows:

> "*A full charge is tapped into a ladle from two furnaces always and sometimes from three. The greater part of the charge is taken from the furnace which is making the most suitable metal, or, if one furnace is working hot and another cold, the manager draws the best mixture he can,* due regard being had to the proper relief and working of the furnace. *But in order to draw a suitable mixture the manager must know what sort of metal he can get from each furnace.* * * *
>
> The irregularity of silicon, as before stated, is the only difficulty. * * * *

"In order to get a more uniform metal, Mr. Snelus is about trying the experiment of placing a twenty-ton ladle on an hydraulic lift at the A pit, *so arranged as to store, mix and pour*, say, three 6-ton to 7-ton blast furnace taps, or to mix blast furnace and cupola metal. * * * *uniform results in the Bessemer department can hardly be expected unless a number of blast furnace charges are mixed.* This would seem to be the theoretical solution of the problem."


WEST CUMBERLAND WORKS 1877
BLAST FURNACES 1300 FT. AWAY
MIXING LADLE FILLED FROM TWO OR THREE FURNACES TO OBTAIN BEST MIXTURE FOR BESSEMERIZING
MIXING LADLE

Further on in page 838, referring to the economy and actual gain at West Cumberland by the use of direct instead of cupola metal, Mr. Holley says, "these savings amount to $1.25 per ton of rails."

It will hardly be disputed but that the practice observed by Mr. Holley at West Cumberland is substantially the same practice as that which forms the subject matter of the first claim of the Jones patent. It is indeed the practice of the Jones invention in a charging ladle as described by Jones in the paragraph of his specification beginning with line 21 of page 372 with one rather finely drawn distinction, namely, that Mr. Snelus' practice as described by Mr. Holley was not stated to result in the production of homogeneous metal though, beyond all question, the practice was one which would result in the production of metal less ununiform than that drawn from the furnaces and the difference being merely one of degree, could not be plausibly argued to afford room for a patentable invention.

The improved method of mixing the iron from the blast furnaces which Mr. Snelus had designed and which he explained to Mr. Holley, and which Mr. Holley published in this report, was, in place of making the mixture to average up the constituents of the iron in a charging ladle, to make it in a large reservoir which would be at the same time a place of mixing and of storing, acting, indeed, exactly as the defendant's reservoir acts and exactly as the intermediate reservoir ladle used in the American Bessemer Works acts. This method devised by Mr. Snelus is not only described in the Holley report (p. 837) but is also described in several other publications reporting the discussion of the Iron and Steel Institute, Mr. Snelus having pressed the use of his intermediate storing and mixing receptacle as a highly desirable device which he was anxious for the trade to adopt.

Thus in the meeting of 1874, before he had had an opportunity of working with direct metal, Mr. Snelus fully disclosed this idea, as will be seen from the matter on page 757, from which we extract the following:

Snelus Statements of 1874 and 1878.

"Mr. Snelus said he quite agreed with Mr. Williams that there was no insuperable difficulty in running the iron direc from the blast furnace into the converter. * * * * The only thing they wanted to do was to insure regularity in the silicon after they had got their furnace working properly, and there was no very great difficulty in affecting this. * * * * He saw no reason why the plan should not answer. * * * He saw no difficulty in taking two blast furnaces, and not only running the iron direct into the converter, but **also insuring regularity in the mixture.** * * * If the charge coming out of the two furnaces should, to any extent, be too silicious, it could be toned down; but the first essential was to get the metal sufficiently silicious to blow well, and *by* **running it into a separate vessel, as they did in America, they could then deal with it as they liked.** *The plan in all the works in America was to melt in a cupola continuously, and then to run the iron into a ladle, which was balanced, and held from 10 to 12 tons. From that the six ton charge was run direct into the converter. They wanted an intermediate vessel between the blast furnace and the converter and to ensure regularity in steel rails, they ought to know the amount of silicon contained in the vessel before it was used. That could be regulated, and there was no very great difficulty in keeping it pretty nearly right in the blast furnace, as he (Mr. Snelus) knew from long experience.*"

Again, in 1878, after he had been working the direct process for some years, and a year after Mr. Holley's report was made, Mr. Snelus again adverted to the matter of the use of an intermediate storing and mixing reservoir, as follows: see pages 789 and 790.

"* * * he had himself been in correspondence with Mr. Holley, who had informed him that at Bethlehem works Mr. Frith was doing half their work direct from the blast furnace, and had for some time had under consideration the idea of a **receiving ladle, so as to receive the metal from the blast furnace, and hold it in readiness there for the converters.** *One great drawback to the direct casting process was, that you could not always yet your metal at the exact time you wanted it. He believed it would be found that the great advantage the Bessemer works in America had was the intermediate receiving ladle, which was designed by Mr. Holley, and which was universally used there,* although it was never used in England. The Moss Bay Company attempted to modify the thing some time ago, and put up a heating furnace, but that, to his mind, was a step in the wrong direction. Anyhow, the thing had failed, and no one in England, as far as he knew, was using any intermediate receiver between the blast furnace and the converters. *He thought himself that the receiver was of considerable importance, both for saving time and for* **facilitating the admixture of iron,** and he was confirmed in that view by the idea of Mr. Frith, of Bethlehem, who was about putting up a 30-ton ladle, according to Mr. Holley, *to receive the metal from the blast furnace and hold it in readiness so that at a moment's notice you could take your iron into the converter and also* **obtain a better mixture.** With himself, (Mr. Snelus) it was a question of expense, and he was very sorry he had not been able to apply it on that account."

HOLLEY—SNELUS—FRITZ 1878
Intermediate Receiving Ladle

To the extent that Mr. Snelus disclosed his conception of the use of an intermediate reservoir and mixer in his published statements to Mr, Holley and to the Iron and Steel Institute, it was certainly open to any in the trade to avail themselves thereof, and the method which Mr. Snelus thus published was one which lies between the method practiced by the defendant, which is mere storage with purely incidental mixing, and the method patented by Jones, which was, mixing to a standard composition with necessary

avoidance of storage in any true sense, that is to say, Mr. Snelus fully understood and fully explained the advantage of storing the metal in his intermediate reservoir and he also fully understood and explained how by a process of selecting the metal which went into his reservoir something like uniformity in the silicon contents of the metal used in the converters could be obtained. But, as it is doubtless true, that substantial uniformity in the non-metallic constituents of the product could not be obtained in a process which involved storage as well as mixing, the difference between the two processes, this process and Jones', is so slight that we cannot see how any inventive faculty could have been involved in passing from one to the other.

Considering the Holly report and the information and advice which he gave to his clients in it, aside from the merely descriptive parts relating to foreign practice, Your Honors will find at the beginning of the report, see page 833, and in the third numbered paragraph, that Mr. Holley states primarily:

> "That the one embarrassing feature in the use of metal direct from the producing furnaces was the irregularity in the silicon of the converter charges."

As to this irregularity in silicon, he says in the fourth numbered paragraph of the same page:

> "*The* **obvious** *remedy is to mix a number of blast furnace charges so as to reduce the irregularity to a minimum.* Two systems of doing this are on the eve of trial; the one is simply mixing so few charges in a tank that the metal will be drawn out before it chills; the other is to **store a large number of charges in a heated tank—that is to say, in an immense open hearth furnace."**

Conclusions of Holley Report.

Then follows Mr. Holley's review of the foreign practice including the matter as to the West Cumberland practice and the Moss Bay Works to which we have above referred and finally, beginning on page 845 of the Record we find his **"Conclusions,"** the first of which is *that his clients, the American Bessemer producers, were not at the time he made his report making pig metal of sufficiently uniform character to make it advisable for them to at once introduce the so-called process, while the second conclusion is that*

> *"We should for some time confine our efforts to the preliminary department of the direct process—to increase our uniformity of blast furnace working and product."*

Mr. Holley's fourth conclusion, pages 845-6, we will quote in full:

"But if the storage of a large quantity of iron in a reverberatory furnace or other reservoir should prove successful, then a few blast furnaces making even an irregular product, and, if necessary, working in connection with cupolas, would largely economize the Bessemer manufacture.

In fact this mixing of irregular iron on a very large scale, thus avoiding the expensive niceties of the ore selection and the necessity of many furnaces, is the theoretical key to the situation. When the way to its successful adoption is demonstrated, the direct process will undoubtedly have great advantages, even over the present practice on the continent, which employs manganiferous ores. But until this large scale mixing is developed, it should not appear that the use of *our comparatively irregular blast furnace metal*, and more especially the use of part blast furnace and part cupola metal, can result in any saving.

But this mixing problem is not such a difficult one. A small amount of flame spread over a large surface of metal, should certainly keep it hot for a long time, seeing that the metal will keep hot in a ladle exposed to the air for an hour or more. And should there be any trouble about stopping the tap-hole in a large storing furnace, it would not be a very difficult or expensive matter (considering the Pernot revolving-hearth experience to tip the whole hearth enough to pour a charge.

So that while we congratulate ourselves that the direct metal users have no large advantages over us in the present state of the art, we may look forward to the development of the metal storing problem with good hope, not only of more economical manufacture, but of more uniform product."

It is argued by petitioner's counsel that the above quoted concluding paragraph of Mr. Holley's report is to be considered like a wet sponge passed over the prior state of the art. Mr. Holley, they say, was the great authority, the foremost Bessemer steel engineer of his time, and here you see in 1877 he spoke of the storage of iron in furnaces or reservoirs prior to Bessemerizing it with an "*if*" as something the practical value of which required "demonstration" as a "problem" in process of development; hence, they say, there was no prior state of the art; Mr. Holley has swept it away and Jones entered upon a virgin field; and this in the view adopted and expressed by the Judge of the Circuit Court.

Now, of course, no man is sufficiently great to have his opinion accepted without question, and as Mr. Holley was not speaking with

direct reference to the Jones patent, which did not exist when his report was made, and was speaking, not with reference to the general state of the art, but with special reference to the practice with which his recent investigations in Europe had familiarized him; what he says has no direct bearing on any question directly involved in this case. Again, it must not be lost sight of that Mr. Holley throughout his entire report, is speaking not of the general art of mixing molten pig metal drawn either from smelting or cupola furnaces, but is speaking exclusively of the use of molten metal drawn from the blast furnaces for the single purpose of making Bessemer steel. Morever, he has directly in view but one drawback to the use of direct metal in Bessemerizing, namely, the ununiform percentage *of silicon* present in the blast furnace metal as it comes from the furnaces and the effect of this uneven distribution of silicon on the process of Bessemerizing. The whole purpose of his report is to show to his clients what had been done abroad in the direction of obviating the evils incident to uniform silicon and to explain to them how they could avail themselves of the benefit of the practice developed, or in process of development, to overcome these difficulties. His report begins and ends with his conclusions from the facts stated in the intermediate part of the report and the main point pressed upon his clients both at the beginning and end of his report is as he states on page 833,

> **"The obvious remedy is to mix a number of blast furnace charges so as to reduce the irregularity to a minimum."**

Or, as he states, the same conclusion at the end of his report on page 845:

> **"In fact, this mixing of irregular irons on a very large scale, thus avoiding the expensive niceties of ore selection and the necessity of many furnaces, is the theoretical key to the situation."**

Petitioner's counsel seize upon the word "theoretical" in the passage last above quoted as a drowning man seizes a plank. Mere theory you see,—they say to the Court. Only a speculation of Mr. Holley's. It was all in the clouds. A matter open to dispute, requiring invention and demonstration to reach a safe conclusion. All this is implied in the use of the word theoretical in some case; but it is not implied in, and it cannot be applied to Mr. Holley's use of the word in the connection in which he uses it, for, as the two passages quoted together show, and as is manifest from the whole

paper, Mr. Holley uses the word "theoretical" as a synonym for *obvious*. A like "problem" was referred to by this Court in *Lovell Mfg. Co. vs. Cary*, 147 U. S. 633, as involving "merely the use of the knowledge possessed by those skilled in the art."

True View of the Holley Report.

What Mr. Holley said to his clients was, if you want to use your blast furnace metal directly in the converters, the trouble to be anticipated is ununiformity in silicon which will result in irregular heats in the converters. This is the trouble which they have met with in England and the remedy which Mr. Snelus at West Cumberland and the designers of the Moss Bay plant have applied is the mixing of the blast furnace metal so as to equalize to a certain extent these inequalities in the distribution of silicon. In addition to their present practice of mixing they are preparing to mix their metals under two different theories, one being the mixing of special batches of metal from which the converters are to be charged until the mixing receptacle is emptied, the other being to mix the metal in storage reservoirs in which latter case, as he points out to them, there was a question as to whether some extraneous means might or might not be necessary to keep the stored metal hot and fluid. Mr. Holley criticizes the design of the storage reservoir in process of erection at the Moss Bay works which was a stationary receptacle in which the metal was poured into the top and tapped off through a hole at the bottom, but, as he points out at the conclusion of his report, the remedy for this defect in construction is a very obvious one, namely, to make the storage reservoir a tipping one from which the metal can be poured a feature which, as he states, involves no great difficulty, as similar devices were in use for other purposes, citing the Pernot furnace (see p. 925).

But his advice to his American clients is that, while the mixing of the metal is the obvious and certain remedy for the inequalities in silicon and while the problem of a proper and efficient storing and mixing reservoir is not a difficult one, their furnace practice was not then in a condition which warranted them in using direct metal, even with the expedient of mixing it before Bessemerizing because, as he tells them, the metal they were then making was *too irregular* in its distribution of silicon. First, he tells them you must improve your blast furnace practice by a more careful selection of ores and attention to the running of the furnace. When you have in this way smoothed out the irregularity in silicon to a certain extent,

you may look to a mixture of your pig metal in reservoirs as the obvious final solution of the problem, because such mixture will effect such further equalization in the distribution of silicon as will make it advantageous to use the metal in the Bessemer process.

Is this Holley report an anticipation of the patented Jones invention? Not in a literal sense, and, primarily for the reason noted by Mr. Carnegie himself as the "great point" when he was examined as a witness for the plaintiff, see page 431:

> "Q. 15. I now show you a copy of the Holley report of 1877 referred to, and ask you to look at the part of it headed "Conclusions;" and I ask you whether, as a practical man, you regard this as describing the invention set forth in the patent in suit, in such manner as to be carried into practice by persons having at that time knowledge in relation to the art?
>
> "A. The conclusions on their face bear the answer to that question. First, the necessity of a new mode—something that hadn't before been done—is required. Its necessity is recognized; but he says: "When the way to its successful adoption is demonstrated," and he also says: "But, until this large scale mixer is developed," and so on. *The* GREAT POINT *is not touched upon here at all. It fails to grasp the soul of the invention*—the law of averages; *the dealing with successive small portions of metal which can be selected either at the blast furnaces or at the mixer.* But Mr. Holley, as you see, recognized the necessity for a further step forward in the art. Mr. Holley lived for five years after his report dated 1877; and if he had found a way to develop the mixer, I think he would have announced it during the five years."

Mr. Carnegie is, we think, entirely correct in pointing out what was not taught by the Holley report. While it taught mixing, to be sure, it was mixing only to such an extent as would **avoid sudden fluctuations** in silicon, mixing with the sole purpose in view of avoiding difficulties incident to the conversion of the iron into Bessemer steel. In short, as Mr. Carnegie implies, all that is to be clearly inferred from Mr. Holley's report is the advisability of using such **mixing as is incident to the storage of** molten metal and which mixing, as he makes clear to his clients, could only be expected to **sufficiently modify the inequalities of silicon** if and when the blast furnace practice was improved to such an extent that the inequalities would no longer be so great as they were in 1877 when he wrote his report.

Whether in view of what Mr. Holley reports to be the West Cumberland practice, there would be any invention possible in con-

ceiving and putting in effect the idea of mixing selected batches of molten metal to a uniform standard composition, is one question, but it is clear that Mr. Holley, if this idea occurred to him, did not consider it as the solution of the problem and that what he refers to as an obvious remedy for the difficulty met with in Bessemerising was not substantial obliteration of inequalities but simply such mixing as would tone down the abrupt variations in silicon until they would no longer present the difficulties to the Bessemer operator which he found to exist when treating metal direct from the furnace.

Comparison of Jones & Holley.

The problem which Mr. Jones set himself to solve was not the same problem to which Mr. Holley's report exclusively relates, for, while Mr. Holley's sole object was to avoid difficulties in the Bessemerizing treatment, Mr. Jones' sole object was to produce from ununiform blast furnace metal, molten metal having all its non-metallic constituents uniformly distributed, so that the product of whatever further treatment the iron was to be put to would also be uniform and as the patent goes on to say, **"the articles"** manufactured "*of a single order of homogeneous composition.*" It is noticeable that while Mr. Holley's report in several places indicates his full appreciation of the fact that the mixing to even up the silicon distribution would result in a more homogeneous product, Mr. Jones' patent nowhere suggests that his homogeneous metal has any effect whatever upon the Bessemerizing operation, and this is the more important, because, as the evidence shows, noticeably that of Mr. Carnegie, Mr. Jones was thoroughly familiar with the Holley report, a report which was primarily directed to him and the other Bessemer experts who, like him, had charge of American works. Clearly then it was *not accident or inadvertence which led to the entire suppression in the Jones specification of any reference to the particular problem to which the Holley report* relates, and to the concentration of the specification to the particular object absent from Holley's consideration and stated in Jones' patent to be the sole purpose of his invention.

Now, of course, if the Jones patented invention of mixing molten metal to a substantially uniform standard composition were commercially practicable it would be a better process than anything suggested by Mr. Holley, or Mr. Snelus, or by the American inter-

mediate ladle practice, or in fact anything shown to have been old in the art except the practice of the car wheel foundries. The silicon being uniformly distributed would, theoretically at least, be better adapted for Bessemerising than where it is merely prevented from changing abruptly, and with regard to the product, whether in converters or otherwise there would be no comparison; the articles made from Jones' uniform metal would be incomparably better, because all of the non-metallic constituents, and notably the sulphur would be evenly distributed. But the fact is, as record shows, that the Jones process has never been used by anybody except Mr. Jones and only used by him for a short period, being promptly abandoned in favor of reservoir mixing in which the metals were not selected and in which the product was not homogeneous or substantially homogeneous and in which the articles made from the iron were similarly lacking in uniformity, that is to say, the *Carnegie works promptly abandoned the effort to obtain uniform metal and were satisfied with the mere avoidance of abrupt change*, not, of course, because their later practice was better from a theoretical point of view but because the advantages of the Jones process were incommensurate to the trouble and expense involved.

Actions of the Steel Manufacturers in View of Holley Report.

What occurred after the receipt of Mr. Holley's report by his clients was that, first of all, they followed his advice and gave attention to their blast furnace product. When they were obtaining a better product, many of them began the practice of using the direct metal in the Bessemer converters and, curiously enough, the Carnegie Co. ignored for a considerable period Mr. Holley's further instructions as to the mixing of the metal; ignored even the efficient practice of the West Cumberland works and carried on their operations just as Mr. Holley describes the practice to have been at Barrow, England. Mr. Gayley and the other expert witesses for the petitioner tell us that this practice was not satisfactory, they had much trouble, certainly, if Mr. Holley was right, they were bound to have trouble, for they ignored his emphatic advice to mix their metal before Bessemerizing it. Then Mr. Jones conceived his idea of the practical obliteration of inequalities in the metal by a *process of selection and mixing to a standard composition*, explained it to Mr. Carnegie, took out a patent for it in which he emphatically distinguished it from mixture incident to storage, and

doubtless, put it in practice; as the result of which it was *promptly rejected by the petitioner itself in favor of the old reservoir ladle practice*, which Mr. Snelus had pointed out as the solution of the problem from the Bessemer converter's point of view and which we think was clearly indicated in the Holley report.

The respondent and other companies throughout the country **never made the mistake** either of trying to Bessemerize their iron without mixture, or the other mistake of believing it to be practically possible in handling this quantity of molten metal to select and mix to a standard composition. They changed from the use of the old intermediate ladle with cupola metal to the use of the big intermediate reservoir with direct metal without going through the expensive experiment of the Carnegie Company in the effort to find something better. It is probable that they derived advantage from the knowledge of what the Carnegie works had attempted to do and had found to be inefficient; but this advantage was simply—that they spared themselves the expense of trying to do without mixing or of trying to mix to a standard composition and were taught that their advantage lay in simply continuing their mixing practice with direct metal, as they and the Wheeling foundries had practiced it with cupola metal, and as Tabberner and Deighton in their patents, Snelus in his public interviews, and Holley in his report had pointed out, was the proper practice with regard to direct metal.

It is true that the intermediate reservoir which the defendant installed at its works was very much larger than the intermediate reservoir ladle which it had previously used in connection with its cupola furnaces, and true that the Carnegie Company was the first concern to instal in America a large intermediate receptacle. The largest intermediate reservoir used in connection with cupola furnaces seems to have been of a capacity of **twenty tons** (Record, p. 126), and the Carnegie Company built what they called their mixer of a capacity of approximately **one hundred tons.** But this increase in the size of the reservoir was forced upon the Company, because the quantity of metal to be handled was very much greater and because each smelting furnace of modern type produced a great deal more molten metal than is produced from any cupola furnace. Snelus had described first a **twenty ton** reservoir (837) and later a **thirty ton** reservoir (789). Mr. Jones, in providing approximately for one hundred tons of metal, followed closely on

FOLDOUT(S) IS/ARE TOO LARGE TO BE FILMED

the suggestions furnished by the Moss Bay construction, where they provided for the storage of **eighty tons** and of the Deighton patent, which the expert witnesses show indicates a storage reservoir adapted to hold about **one hundred tons.** This is interesting, because it shows either that Mr. Jones got his idea as to the proper capacity of the reservoir from these older publications, or that the similar conditions under which all of the designers were working resulted in the provision of similar receptacles. The respondent when it installed its reservoir, made a long step forward in putting in a reservoir of **three hundred tons** capacity.

Practical Teachings of the Prior Art.

The facts which we have stated as to the prior state of the art, and we have carefully avoided overstating any of them, and have, in fact, understated the resemblance of some prior uses and publications to the Jones invention, establish that the mixing of molten pig metal for the purpose of averaging up its constituents to a great or less degree was a very old and very common practice, and that with regard to all prior uses except that of the West Cumberland Works, the practice was to maintain a residue in the reservoir or receptacle in which the mixing took place, such a residue being maintained not only because of its recognized effect upon the mixture secured, but also, and, primarily, because in all cases it was desired to store as well as to mix the metal. The proofs further show that at the West Cumberland Works the defect of the practice in which mixture was made without a residue was fully recognized by the manager, Mr. Snelus who clamourously insisted that the only proper way to handle the metal was in a reservoir and with a residue, and that he was only prevented from installing such a reservoir because his superior officers would not consent to the expense. The Holley report may be taken as the opinion of one of the ablest steel men in the United States, to the effect that the best that could be expected of mixing, either in the then state of the art or with such improved furnace practice as was to be expected within reasonable time, was that dangerously abrupt variations in silicon could be avoided and that even if this was not to be practically expected until the furnace practice was materially better. In short, the state of the art pointed out unerringly to just such a practice as that now carried out and in use by the defendant Com-

pany, and it may fairly be said that nothing in the state of the art indicated that metal drawn directly from the blasting furnaces could by any commercially practicable means be mixed in such a way as to produce substantially homogeneous metal for further treatment which would result in the manufacture of articles of homogeneous composition.

But while all this is true we submit that there was **no room for an inventive thought or conception in devising a practice of mixing to a standard composition** by selecting from a number of available batches of metal those which when mixed would average up to the standard. This was an **obvious expedient.** Any schoolboy having the quantity and composition of a number of batches given to him could calculate which of them when mixed together would average up to a given standard, but it is equally obvious that the schoolboy would at times find no place for the use of certain individual batches and would have to stand them to one side again and again and as this stuff is molten metal it can't be stood aside indefinitely because it would cool and if you use it at the wrong time it will destroy your substantial homogeneity of product. Such a process of mixing by selection and to a standard composition was therefore recognized as impracticable in 1877 and proved to be impracticable in 1887 when after patenting it Mr. Jones abandoned its use and went back to what the art taught, namely, the practice of storing in reservoirs with the attainment of only incidental mixing. Doubtless the improvement in blast furnaces between 1877 and 1888 had been *great enough to warrant Mr. Jones in the hope that mixing to a standard composition had become feasible,* **but he was wrong,** and great as the improvement in furnace practice has been since it is still impracticable to mix to a standard composition and no one does so, desirable as such a result would be. It seems to us therefore that the state of the art completely negatives inventive novelty in Mr. Jones conception even if it had been practical and successful because both the result and the method of securing the result specified by Jones is obvious when the conditions are such as to make it practicable. Certainly, we submit, it negatives any invention in the disclosures made by Mr. Jones because we have shown you that none of these suggestions were effective under commercial conditions, to produce the specified results.

Kirk on "Founding of Metals" and the Whitney and Like Car Wheel Making.

The patent is anticipated by the Kirk publication, and the Whitney and Like cupola practice where all the metal from the furnaces was tapped at intervals into a large reservoir and mixed and delivered in small charges for casting, the vessel being intentionally well filled up to obtain uniformity of the mixed metal.

Kirk's "Founding of Metals."

In the prosecution of the Jones application the original claim was rejected upon Kirk on "Founding of Metals"; a new claim substituted, and that claim again rejected on the same reference, (pp. 725 7). It was in view of this and the Witherow patents that the idea of storage was removed from the specification and claims of the Jones application, and it was limited to the peculiar mixing operations shown above to require the mixing of selected portions of metal to obtain standard uniform composition. This Kirk publication certainly describes the essence of reservoiring and mixing metals where no opportunity is provided for selecting the metal to be mixed when in molten condition. It describes the mixing of cupola metal and the casting of the mixed metal, but we have shown above (in pages 64 to 71 of this brief,) that Jones included both within the scope of the patent as issued.

The Court of Appeals evidently took this Kirk mixing as a type of the cupola mixing practice, just as they took the Deighton patent as a type of mixing blast furnace metal. We will show that both Kirk and the Whitney, and like practices were absolute anticipations of the Jones method, except in the selection of the molten metal to be charged into the vessel. The Court of Appeals says, (p. 1119):

> "Kirk sets out the function of a large intermediate reservoir to be used in the mixing of molten metal drawn from the cupola."

The entire Kirk publication is found on pp. 822–25, and we request its consideration. It first shows that the foundryman can, by physical examination, only approximately tell the nature of the iron, and make a good guess, that the melting, in both blast furnace and cupola, changes the quality of the iron without any change of ores or pig to be remelted, and without any apparent cause for the

change in the quality. He gives an example of what may lead to change in quality, and says:

> "I have seen two cupolas melting the same iron and one produce good, soft, strong castings, and the other produce hard or brittle castings."

He then shows the difference in irons as to the practical point of shrinkage in cooling, or cracking in cooling, he points to the necessity of uniform iron for casting, and the difficulties of mixing of metal charged to the cupola to counteract the irregularities, and finally describes the intermediate ladle practice as follows, (p. 825):

KIRK FOUNDING OF METALS 1879
IRON RUN INTO MIXING LADLE AND POURED INTO SMALLER LADLES AT THE SAME TIME.
CUPOLA
LARGE MIXING LADLE.

"In melting iron I should recommend melting it hot, and as fast as possible. A quantity of molten iron should be kept in the cupola or in a large ladle, so as to give the different brands of iron a chance to mix. In most all the foundries at Wheeling, West Va., the cupolas are never stopped in from the time the blast is put on until the bottom is dropped. *A large ladle is set on trestles in front of the cupola in such a manner that the iron can run into it from the cupola and be poured out into the smaller ladles at the same time. The iron is all run out of the cupola as fast as it is melted, and is mixed in the large ladle. I think this is a good way of mixing irons.*

This article discloses continuous mixing by the use of a large ladle or reservoir from which the metal is poured into the smaller casting ladle, while the metal from the cupola runs as melted into the body of the metal remaining in the reservoir. Each step of the Jones method is present except the carrying of the metal from the cupola to the reservoir in separate ladles.

This cupola practice which is undoubtedly as old as cupola melting, is admitted by petitioner to be common, obvious, reservoir practice. Mr. Metcalf, who seems most familiar with the same, describes this practice at length (p. 626) indicating just the practice followed by respondent, except on a smaller scale; the metal coming from the furnace in relatively large bodies and being used in small portions taken away in hand ladles, the furnace being tapped at relatively long intervals and the reservoir being tilted at relatively short intervals to pour the small charges into the casting ladles. He shows the difficulties in tapping small ladles full from the furnace and clearly proves the necessities even with the cupola furnace which with its great output of blast furnaces, led this respondent to adopt the reservoir practice in making Bessemer steel, and clearly proves the Kirk and respondent's reservoir practice to be identical.

Though he does not at this point refer to the mixing operation, he tells us (A 173, p. 652) "You can't pour two metals together without making a mixture";—and (A 174) that this rule applies to foundry practice such as disclosed by Kirk;—and he says (A 175)

"It is a simple fundamental law of nature; I suppose it "was always known ever since man began to observe nature's "laws."

We have referred particularly to this Kirk application because it was cited as a reference to the Jones application, and Jones in view of the same erased all mention of storing or reservoiring from

his application in order to obtain the patent, as fully shown above. Its relevancy in that connection will be further discussed in considering the Whitney practice below.

Whitney and Like Car Wheel Practice.

This foundry use is believed to be a clear anticipation because it was a process of mixing having for its **main object the attainment of uniformity in the iron,** an object which was substantially carried out in practice, and because it was a method of mixing in which the metal from the furnaces was charged into the mixing reservoir upon a residue contained and maintained therein.

It is to be noted, however, that the foundry practice differed from the operation described or fairly indicated in the Jones patent in several particulars, to wit:

(1) Because in the foundry practice the mixing receptacle was not alternately charged and discharged, as Jones clearly indicates it should be, but was maintained substantially full during the working hours the metal being run through it as a continuing operation, and not mixed in separate batches.

(2) Because in the foundry practice, as the mixing receptacle was maintained substantially full during working hours, and the residue into which the fresh metal was charged was always preponderating and dominating in its characteristics.

(3) Because in the foundry practice no selection of the molten metal to be charged into the mixer was made, but all the metal from the furnace was dumped into it as made and ready for delivery.

(4) Because, while the foundry reservoirs were used with the particular purpose of securing uniformity in the metal used, it is clear that they were also used as reservoirs are usually used and for the purpose of storing the molten metal, a mode of use emphatically distinguished by Jones from that which constitutes his patented invention.

It may seem to Your Honors that our statements above are irreconcilable, in that we state the foundry use to be a clear anticipation of the Jones invention, that is to say, the same thing, and also state that the foundry use is essentially the same as that which Mr. Jones distinguished, and in effect disclaimed in the proceedings in the Patent Office and in the amendment of his application. The conflict, however, arises because Mr. Jones secured his patent

upon the basis of a statement of fact made by him through his attorneys to the Patent Office, which the proofs in this case show to have been totally unjustified. To recall the matter to Your Honors' minds. You will recollect that when the Jones application, which was for storing and mixing, as originally filed, was rejected on a number of prior patents and publications, including Kirk's "Founding of Metals," above referred to; Mr. Jones' attorneys differentiated the mixture secured by Jones from that secured by Kirk and others in the prior art, saying that the Jones mixture was only such mixing "as results in **a uniform average quality of metal,** whether treated in the converters or used for casting without such treatment, which is very desirable and has been **hitherto found to be practically unattainable.**" The further amendment of the application made in consequence of a second rejection on the Kirk publication, being for the evident purpose of limiting the invention claimed to a process of mixing to a uniform average composition, as distinguished from reservoir mixing described by Kirk and which it was stated to the examiner **could not** secure uniformity.

Now the fact is, as the Car Wheel Foundry uses prove, that reservoir mixing as described by Kirk and as practised in the Car Wheel Foundries, **did, in the wheel foundries at least, secure substantial and practical uniformity and homogeneity of product,** and therefore the Patent Office officials were induced to allow this Jones patent by a misleading statement and upon the incorporation into the application of distinctions which did not in fact distinguish.

We have no reason to question but that the misleading representations made to the Patent Office Examiner were made in good faith and accepted and acted upon by the Patent Office in equal good faith, but it cannot be doubted, we think, that if the facts as to the wheel foundry use had been known to the Examiner the patent would not have been granted, certainly not without very material changes and limitations in the claims.

The Whitney practice though preceding Kirk, was a high development of the mixing principle, from which the practice described by Kirk was evidently taken. It commenced in 1847 and continued up until the time of this suit, making from 50,000 to 70,000 wheels per year (pp. 115,123), the works being prominently located on Broad street, Philadelphia, and the car wheel manufactory being known throughout the United States. The annealing of the car wheels

was patented in 1848, and involved in litigation reaching this Court in the case of *Mowry vs. Whitney*, 14th Wallace, 620.

This practice is fully proven by John R. Whitney, the son of the orginator of the plant, and A. J. Frederick, employed there for 40 years (pp. 115 to 124), and by W. F. Durfee, who visited the works in 1864 (p. 237); and the working drawings of the plant are found in the record following page 992.

The practice was followed in other works, and the evidence in the case includes proof as to use both by the Pennsylvania Railroad at Altoona, Pa., commencing in 1871, (p. 178) and the Taylor Iron & Steel Co., at Highbridge, N. J., in 1868, (p. 285).

The practice at Altoona is fully proven by Spielman and Osbaugh (pp. 177 to 188), and by Durfee who saw it in operation, and is described in "Engineering," published in 1877, (p. 799). The Taylor practice is proven by Taylor himself (pp. 255-8, 425-6).

The Court of Appeals evidently included all this practice within the same class as the Kirk publication, and we now discuss them to show their development and that they contain the essence of the Jones invention.

Purpose of Foundry Mixing.

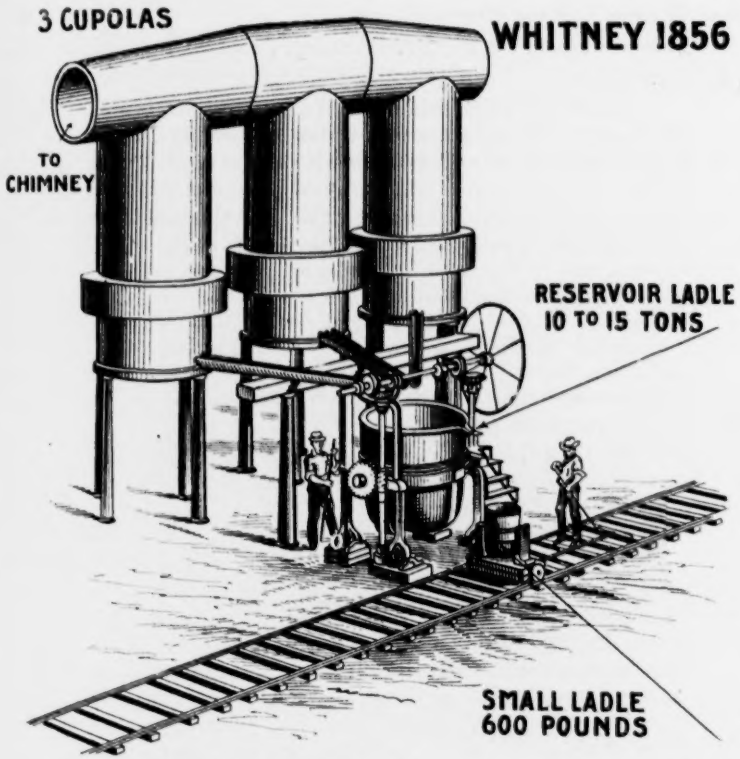
The purpose of the Whitney mixing practice was to produce car wheels having practically even thickness of chill on the tread and flange. A peculiar quality of iron was used which when contacting with a metal mold would chill and produce a laminated crystalized structure, hard and of high wearing qualities, but which was very brittle, such high wearing face being supported by the metal back of it which remained in the ordinary condition of cast iron, a picture showing the structure being found in 14th Wallace, p. 622, in connection with the said suit of Mowry vs. Whitney. The unchilled cast iron back of the chilled portion gave the strength to the wheel, and it was necessary that this chill should be of even depth to provide for the wear and yet leave sufficient cast metal backing to give the necessary strength to the wheel.

The depth of the chill was controlled by the metalloids in the iron, practically the carbon and silicon. The depth of chill increased as the proportion of carbon increased, but the depth of chill *decreased* as the proportion of silicon *increased*. To give uniform depth of chill in all the wheels produced, the mixing practice proven in this case was adopted, the purpose being by assembling a large body of molten metal to even up these metalloids.

The Operations at Whitney Foundry.

This mixing of the molten metal was accomplished by the employment of a large reservoir ladle holding from 12 to 15 tons. The metal was tapped from the three cupolas into this reservoir until it was full and small ladles for castings the wheels were filled from the reservoir, the metal being tapped from the cupolas into the metal remaining in the reservoir and the reservoir being always kept at least half full.

The general facts as to the Whitney practice are admitted in the opinion of the Circuit Judge (p. 101–4), but the proofs are so clear and unmistakable that direct reference will be made to them.



The reservoir held from 12 to 15 tons, that is 24,000 to 30,000 lbs. (116); the measurements from the drawing showing a capacity of 34,292 lbs., over 17 tons (669).

Three cupolas were used, each holding 25 to 30 tons (A 11, p. 117). They melted from 50 to 80 tons per day (A 7, p. 117).

The cupolas were tapped into the reservoir about every 10 or 15 minutes (A 11, p. 117).

The tappings are stated to be about 500 or 600 lbs. (121), but petitioner has shown they might have been up to 2000 (662). It is presumed they were between these weights. It is not important.

Small ladle charges of about 600 lbs. were withdrawn for casting the wheels (121).

The reservoir was kept well filled up during the entire mixing and pouring operation (116, 123).

The Reason for this Practice.

This is well stated by Mr. Whitney, proprieter of the works, (A. 6, p. 116):

> "When the ladle was nearly full we began to pour from it into smaller ladles, each one of which held enough for one wheel; if it was an ordinary sized wheel it held enough for one wheel, and if the wheels were smaller ones it held enough for two or three. As that drew the molten iron from the ladle and the iron continued to melt, the ladle was constantly being filled from the cupolas, and it was kept full until all the iron charged in the three cupolas was melted and the bottoms dropped. Then the iron was continued to be poured out of the large ladle until it was all used, **those two methods making the uniform mixture; that is, we mixed it in a solid state, first by our charges and then in the molten state in the large ladle,"** and again (A. 9, p. 117):
>
> "A. As the mixture was charged into each cupola, as I have stated, it was made up of irons from various furnaces, some iron having one quality and some another. As it is melted in each cupola, it did not all melt at the same time, and if we had drawn it directly from the cupola into the small ladles from which we poured the wheels, one wheel might have been poured out of very hard iron, another wheel out of very soft iron, and so every shade between. There would have been no uniformity in our work. But by taking it from the three cupolas, all melting the same charges of iron, and collecting them in a molten state, *the inequalities of melting were all overcome and a* **uniform product produced.**

Frederick, the foundryman of forty years experience in those works, said (A. 11, p. 123):

> "There is a great change in iron, and sometimes you have an idea that you have the same kind of iron and put it into a

furnace, and it may be **too soft or too hard without this large ladle. * * * The ladle makes it uniform by the quantity of molten iron being put into that ladle, which works itself up."**

Taylor, (p. 426) says in regard to this same practice-

"Q. 39. When you use the reservoir in connection with the cupola when melting the old car wheels and scrap as well as the pig metal in the cupola, why was the reservoir necessary?

A. The reservoir was necessary to mix the molten metal from the old car wheels, scrap and pig metal to equalize the irregularities of the metal.

Q, 40. Did you use the reservoir when melting pig iron exclusively in the cupola, and if so, how far back did you follow this practice?

A. Yes, from the time we commenced to make car wheels.

Q. 41. Was the reservoir necessary when melting pig metal exclusively in the cupola, and if so, why?

A. The reservoir was necessary when melting pig metal exclusively in the cupola in order to equalize the irregularities due to all pig iron."

Totten, referring to metal for casting chilled rolls having the same requirements as car wheel castings, says (p. 199):

"It is a well-known fact in foundry practice that the metal from an air furnace will vary in quality according to the conditions of fuel and atmospheric temperature, and that if the same kind of metal was used in a cupola furnace as it trickled down through the beds of coke, it would become impregnated with the impurities of the fuel, such as sulphur, and that if you attempted to pour a roll directly from the air furnace and from the cupola furnace without carrying the melted iron into a common reservoir, **some parts of your roll would be hard and some parts soft**, and the purpose of conveying them into a common reservoir was to allow the **intermingling of these melted products and to produce a uniform homogeneous mixture**, which was an essential thing in the casting of a chilled roll.

And also (p. 201):

"Q. 20. Well, is there any variation from these causes or other causes in the **quality of metal tapped from a cupola during the same melt or run?**

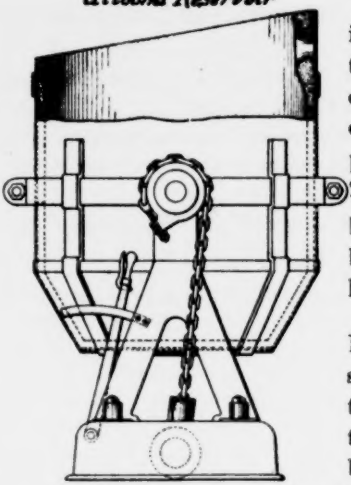
A. I believe, as a rule, that there is **great lack of uniformity**, because even in the same car-load of coke there will be variations in the quality, and this will affect the result of the melting."

It is abundantly proven that the cupola metal drawn from the furnaces, even with careful selection of the metal charged to them, was too irregular for casting car wheels (Spielman, foreman P. R. R. foundry, Q. 38–41, p. 181; Osbaugh, Q. 28, p. 186. Also above quotation from Kirk in "Founding of Metals.")

Petitioner's witness Metcalf, referring to the Whitney practice with which he was familiar, said (A. 129, p. 645):

> "If when his cupola began to melt he (Whitney) had started then to take out one wheel weight at a time as fast as melted, **he would undoubtedly have had much more irregularity in his metal than he had in the way in which he worked.**"

Altoona Reservoir



Sixteen (16) witnesses, including some called by petitioner, testified as to the irregularity generally of cupola metal. In addition to the above, see Taylor, p. 288; Evans, p. 92; Hunt, p. 291–2; Campbell, p. 126; Wood, p. 170; Price, p. 328, Q. 16; Fry, p. 508–9; Williams, p. 487; Martin, p. 132, A. 9; Robeson, p. 354.

In Spretson's "Casting and Founding", published in 1884, describing the car wheel practice at the Whitney works, it states first the care in selecting the metals to be re-melted and says:

> "But these mixtures have to be altered frequently, owing to irregularities in the nature of the metal, and daily tests are made with a view of ascertaining what changes, if any, have to be introduced into the next day's work."

The Practice gave Practically Uniform Product.

Whitney, in describing their practice stated, first, the care in selecting the metals to be remelted; next, the above process of mixing, and stated:

> "Those two methods making the uniform mixture; that is, we mixed it in a solid state, first, by our charges, and then, in the molten state in the large ladle."

And again, (p. 117) he says, that by the process, "the inequalities of melting were all overcome and a uniform product produced"; and, (p. 120), "it gave us the most uniform quality it was possible to obtain."

See also Frederick, A. 10-14,p. 123; Spielman, A. 34-35, p. 181; Osbaugh, Q. 21, p. 186.

In "London Engineering" for1877, describing the Altoona Works, operating the same as Whitney's, where a ladle of twenty thousand (20,000) was employed, it says, (p, 800):

> "It was found advisable to employ a ladle of so large a capacity, because by doing so a **more completed mixture of the different irons is effected,** than would be the case if a smaller vessel were employed."

Whitney Shows Every Step of the Second Claim.

(*a*) He practiced "*the art of mixing molten metal to secure uniformity of the same in its constituent parts preparatory to further treatment.*" That the cupola metal was "molten metal" such as was intended to be included within the scope of the patent and such as was included specifically in the Jones apparatus application (p. 737) has been shown above. That the object was to secure uniformity is also made clear. It is also shown that the casting of the metal was included in the term "further treatment" meant to be covered by the claim. In mixing this metal, the following steps were followed:

(*b*) Introducing into a mixing receptacle successive portions of molten metal ununiform in their non-metallic constituents, sulphur, silicon, etc.

The irregularity of the metal has been shown above as well as the necessity of uniformity in the metalloids. That this step was followed is made clear above.

(*c*) *Removing portions only of the composite molten contents of the receptacle without entirely draining or emptying the same.*

That this step was followed is also made clear, the custom being to keep the vessel well filled up, as above shown. If the patent should be construed as in the Circuit Court, this was certainly a "dominating pool," of sufficient quantity to assimilate the ununiform metal without materially affecting the mass.

(*d*) *Successively replenishing the vessel with fresh ununiform additions.*

The additions to the vessel were in small quantities not more than one-twelfth to one-fifteenth of its contents.

Petitioner's witness, Metcalf, testifies positively to all these steps corresponding to the claim, (p. 645, × Q, 124–127). The purpose and results were the same. It was uniformity of mixed metal to produce uniformity of product. This was obtained by the identical steps of mixing called for in the claim. It is peculiar that Spretson on Casting and Founding, p. 263, states that this chilled cast iron "scarcely differs in chemical or physical properties from steel, except that it cannot be tempered." The mixed and uniform product is, therefore, clearly analogous to the steel product even if the Jones method were limited thereto.

Petitioner's witness Metcalf, after acknowledging the steps of the process and the irregularity of the wheels if cast from the metal as melted without mixing, says, (p. 646):

> "But it must be understood distinctly that no good founder, within my knowledge, ever did run a furnace in that way, and it was the efforts to run blast furnaces in that way which caused all the trouble in the direct process, and it was those troubles which Jones overcame by his method."

This is a fair acknowledgment that the processes are identical, and that the **steel makers had been stupid in not utilizing the knowledge within their reach.** As to the identity of the process we also call attention to respondent's experts, Durfee, (237, 238); Forsythe, (273); Capt. Hunt, (304); and Morgan, (365).

Comparison of Jones' Method and Foundry Practice.

We have already, at the beginning of our consideration of the foundry practice, pointed out wherein it differed from the Jones practice as specified, and your Honors will note that the differences in the way in which the reservoir is used are exactly the same differences which distinguish the respondents use from the operation described by Jones. The petitioner's counsel and the judge of the Circuit Court evolve as the distinguishing difference between the car wheel foundry practice and the so-called Jones process as used at the Carnegie Works, that the foundry practice had for its object the production of substantially uniform pig metal while they say the "Jones process" had for its object the prevention of sudden variations in silicon without securing uniformity.

Errors of Circuit Court as to Whitney.

Briefly, the plaintiff's counsel argued, and Circuit Court held that the Whitney and similar uses were not of the same process because they are proved to have secured that uniformity and homogeneity of composition, which is the sole declared purpose of the Jones process as patented.

The above is so startling a statement, that we will ask the Court to verify the correctness of our position by reference to the opinion of the Judge of the Circuit Court, (see Record, page 702).

"The *sine qua non* of purpose in Whitney was **product uniformity.**" * * *

"In Whitney, non-uniformity whether gradual or abrupt would be alike fatal. In Whitney relatively absolute uniformity is an essential of product and a sequence of material used; in Jones, uniformity is a non-essential, in fact, a non-attainable attribute of product and is a necessary non-sequence of material used. * * *

"We find in the Jones and Whitney processes a substantial difference of purpose.

"We start then in the Whitney process with the end in view of attaining and maintaining an unbroken dead line of uniformity."

His Honor had certainly argued himself to a great distance from the specified and claimed invention when he held as he did in the above quoted passages of his opinion that the Whitney use having *in view uniformity of product* was **therefore** necessarily a different use from Jones'.

It is argued by the petitioner's counsel that because in Whitney and the other wheel foundries pig metal was selected and mixed dry before being melted that therefore the Whitney process was different from the Jones process, and it would appear that the Judge of the Circuit Court adopted this view and was further led to the belief that because of the mixing of the pig before melting, the product in the cupola furnace as it was delivered into the mixing reservoir was practically homogeneous and did not require further mixing. Thus (page 704) His Honor says:

"That mixing took place may be conceded, but it was a mixing of constituents which could only and must eventually result in unvarying uniformity * * * In considering Whitney's teachings as to kindred art, it must not be forgotten that fairly considered *storage was the principal object of his*

reservoir, and mixing the mere incident. * * * It would seem, therefore, that the foundry reservoir would be regarded by workers in kindred arts more as a storage than as a mixing receptacle."

His Honor arrived and could only arrive at the above conclusions, by accepting the arguments of counsel as the evidence of the case and ignoring the facts proved in the Record. It is, we believe, entirely immaterial with regard to use of a method of storing and mixing metal whether the users had primarily in view the storage function or the mixing function, because they necessarily *availed themselves of both functions*, but in holding that the purpose of the wheel foundries in using a reservoir was practically storage and only incidental mixing His Honor ignores the testimony of every man connected with the art who testified in the case and the evidence of the publications describing this use. The evidence of Whitney, Frederick, Taylor, Totten, Durfee, Speelman, Osbaugh, Morgan, Hunt and Forsyth, is all to the same effect, namely, that the function of the Whitney reservoir as used was primarily the mixing of the pig metal to a substantially homogeneous composition and that without this mixing in the reservoir the necessary uniformity and homogeneity of metals could not be secured.

The function of the practice as described by Kirk in the Founding of Metals (p. 825) is its mixing function. The function of the reservoir as described in the Engineering publication (pp. 799-900) is solely its mixing function.

The above cited evidence not only establishes how amazingly in error the Circuit Court was in its finding that mixing was only the incidental and storage the primary purpose of the use of the reservoir in the wheel foundries, but it also establishes that contrary to the finding of the Court the cupola metal which was delivered to the mixing reservoir was not uniform in composition and did imperatively require mixing in order to secure the standard composition necessary for making car wheels. The Judge, from whose opinion we quote, seems to have assumed that because an attempt was made to mix the pig before melting so as to, theoretically, average up their composition to a determined standard, that **therefore** the product of the melted mixture would necessarily be of the desired standard composition. But this assumption again, is one based on argument and not on evidence, for the evidence

shows conclusively that the cupola furnace is irregular in its operation and that in melting material even of exactly the same character it will produce divergent results. This is stated by the witnesses called to prove the usage at the car wheel foundries and the fact is confirmed by the witnesses as to the Bessemer Ladle practice and by publications.

The evidence, and it is not disputed, emphatically shows that, even with the greatest care in the selection of the iron to be melted, cupola furnaces are not capable of producing iron of uniform composition and that to secure substantial uniformity, which for car wheel founding was necessary, it was essential that the molten pig metal from the furnaces should be mixed and averaged up by which expedient the substantial uniformity necessary was secured.

Whitney & Holley Preliminary Steps.

The preliminary selecting of the pig metal before its melting in the cupola was exactly such a step as was recommended by Mr. Holley in his report to the blast furnace operations, that is—it was a step in the direction of uniformity taken with full recognition that absolute uniformity could not thereby be secured, just as Mr. Holley told his clients that the preliminary step in the direction of the successful use of blast furnace metal in converters, was a more careful selection, (and that means mixture,) of the ores charged into the furnace and more attention to the prevention of irregular workings by the furnaces. In modern American practice we have better ores than at the time Mr. Holley's report was written and their selection and admixture is much more carefully attended to than it was in 1877. The product of our blast furnaces, while still irregular, is not so irregular as it was twenty-three years ago; indeed it is very much better than it was thirteen years ago when Jones installed his mixer and, logically, if the Whitney use is to be distinguished from Jones because Whitney took precautions to obtain his molten metal from furnaces with as little irregularity as possible, then the modern blast furnace practice involving a more careful selection and mixture of ore and the production of metal of less irregularity would also distinguish the modern practice from Jones' practice. In short, the distinction urged by the petitioner, viz.: —that precautionary steps taken before mixing to lessen irregularities would differentiate the process of mixing in which these steps are taken, from one in which no such steps are taken,—is not only absurd upon its face, but, to be even considered, would neces-

sarily involve a limitation to be found in the patent as to the application of the treatment to metals of some definite degree of irregularity, Nothing of this kind is of course found or implied in the patent.

Cupola and Blast Furnace Metal.

What has been said above leads us to the consideration of another point by which the petitioner's counsel undertook to distinguish the Whitney use from the Jones method, namely, because the molten pig metal which Whitney mixed was pig metal drawn from cupola furnaces, while the pig metal used in the Jones process was drawn directly from blast furnaces.

We have already, (See pages 68 to 71) in our exhaustive analysis of the patent, shown that the Jones process was not limited to the treatment of blast furnace metal, and was not intended to be so limited. We have also pointed out that, in the nature of things, there could be no distinction drawn between blast furnace metal and cupola metal, because both metals are the same. It is of course true that in the process of charging a cupola furnace with solid pigs of iron a certain dry mixture of the iron can be effected, by means of which the composition of the product of the furnace will be more nearly of a standard composition than any of the pigs. We have shown, however, that even with the most careful selection uniformity cannot be secured, and have noted the fact that the manipulation in dry mixing the pigs is exactly the same as in dry mixing the ores, in accordance with the practice of the best blast furnace operators. It is to be presumed that the foundry practice was known to most people in the steel trade; indeed, the intermediate ladle of the Bessemer steel makers was practically the same device used in a similar way and with similar remelted iron.

The applicability of this practice to direct, as well as remelted metal was obvious and, indeed, fully recognized. It had been clearly pointed out by Mr. Snelus in his articles, to which we have already referred. Yet the petitioners' counsel claims that Mr. Holley, in 1877, referred to the mixing of the direct metal as "a problem." So it was, but it was a practical problem, not one requiring an inventive solution. The difficulty in the application of the foundry practice to the treatment of direct iron for use in converters was, as Mr. Holley states in his report, that the metal as it came

from the American blast furnaces was too irregular to make any practical method of mixing it a solution of the difficulty. The "problem," then, was to improve the running of the blast furnace. When this had been done to an extent which would produce metal in some degree approximating the evenness of composition to be looked for in cupola metal, then, as Mr. Holley states, the problem was solved. Mixing was the obvious, the well known, the generally used, method of evening up the irregularities in pig metal which was not too irregular for this remedy.

The Use of the Mixed Metal.

The only other distinction which we believe was urged in the lower courts to differentiate the Whitney foundry practice from the Jones invention was the different uses made of the mixed and unified pig metal. This pretended distinction of course was based on the assumption that the Jones patent was to be construed as limited to the use of his mixed metal in making Bessemer steel. We have thoroughly exploded this assumption in our discussion of the patent, (see pages 64 to 68), showing, we believe, that it is an impossible limitation and that the patent is one for mixing the pig metal which ends when the substantially uniform product is obtained and is not concerned with the use made of the product.

Authorities Bearing on the Cupola Foundry Practice.

If our views of the construction of the patent are correct no authorities are needed, for the foundry practice and the Jones process are the same. If, however, the patent as amended by the disclaimer and construed by the petitioner is to be considered, the following authorities show that there is no possible invention.

The authorities on this subject seem to point but one way, even those cited by petitioner and referred to in the opinion of the Circuit Court.

The closest cases bearing on the subject are the "Furniture Spring" case, *Lovell Mfg. Co. vs. Cary*, 147 U. S. 623; and the "Glue Soup" case, *Leggett vs. Standard Oil Co.*, 149 U. S. 237; and these we believe are controlling of the present issue.

Furniture Spring Case.

In the furniture spring case the patent involved a supposed peculiar tempering of steel furniture springs, and the main refer-

ence was a prior practice of tempering clock springs, and the Circuit Court had sustained the patent as an application of an old process to a new use. This Court reversed the decision, holding that the prior tempering of the clock springs anticipated the process.

In reviewing the subject this Court noted the argument that the purpose of the tempering was different, one to give resiliency and the other to give sound, and held (p. 633):

> "The result in both cases is the same, namely, the restoration, stiffening and equalizing of the wire, and the only difference is in the use to which the resulting article is put. * * * * **The question was, how to equalize and stiffen the mechanically strained steel wire. The same problem has been solved** by the clock-bell makers and the solution of the problem was merely the use of the knowledge possessed by those skilled in the art." * * *
>
> **"The difference contended for * * * is not a difference in the process, but is at most a difference in the articles to which the process is applied. If the straining of furniture springs is peculiarly aggravated because of their shape, the difference is merely one of degree, not of kind."**

After discussing some details as to the tempering of different springs, wire clock-bells, hair springs and furniture springs, the Court says:

> "But it does not amount to invention to discover that an old process is better in its results when applied to a new working, than would have been expected, the difference between its prior working and the new working being only one of degree and not one of kind. It has often been held that the mere fact that one who uses a patented process finds it applicable to more extended use than has been perceived by the patentee, is not a defense to charge of infringement. It follows, necessarily, that **the public cannot be deprived of an old process, because some one has discovered that it is capable of producing a better result,** or has a wider range of use than was before known."

The Court cited *Smith vs. Nichols*, 21 Wallace, 112; *Roberts vs. Ryer*, 90 U. S. 150; *Hollister vs. Benedict Mfg. Co.*, 113 U. S. 59; *McClain vs. Ortmeyer*, 141 U. S. 419, and many other cases.

The Court finally (pp. 687-9) summarized the finding of the Circuit Courts as to the supposed different purpose and different

result, as to the immediate reception of the patent springs upon the market, and the large trade built up, etc., and ended their opinion as follows:

> "But we are of opinion that the **same principle set forth in the patent was developed in the manufacture of wire bells for clocks and of the hair balance springs;** that there was no patentable invention in applying that principle to the springs mentioned in the specification, and that the case is **merely one of a double use.**"

This case is wonderfully applicable to the present case. A point was made as to the use of a new material, dwelling upon the general introduction of Bessemer and open hearth steel shortly before the patent. The Court held that there was no invention in applying the process to that material, saying:

> "It was then natural that there should be introduced into that art methods of treatment which were well known as applied to allied uses." (p. 636).

So in the same way it was urged that the invention was to a new use, just as the argument has been made here that the claims limited to the treatment of Bessemer steel, but this Court said, (p. 636).

> "The "coiled springs," to which, by the claim, the method of tempering is applied, include all such springs, **irrespective of the the use to which they are to be applied."**

The above case is believed to so clearly show the law proper to be applied to this case that we could well rest on it alone.

It is to be noted that one of the principal authorities cited in the opinion of the Circuit Court (p. 707) was *Cary vs. Wolf*, 24 F. R. 139, which was overruled by the above decision of this Court.

Glue Soup Case.

Considering the attempted distinction between the treatment of direct or blast furnace metal and remelted or cupola metal, this case of *Leggett vs. Standard Oil Co.*, 141 U. S. 287, is most instructive. The invention was for a method of lining oil barrels with glue, the custom having been to remelt the glue, as Whitney and others remelted the pig metal, and line the barrels with it when in molten state. The supposed invention was in using the glue as brought down from the glue-making materials to the proper consistency, the claim being that such "glue soup" was "more freely absorbed by the wood, penetrating its fibre deeper than by the ordi-

nary mode," that is, remelting glue; and this Court held it to be a mere commercial suggestion, saying (p. 295):

> "It was well known that liquid glue had these coating and sticking qualities before it had ever been dried for commercial purposes, and **to use it in its liquid state certainly did not embody the quality of invention.** The only object or reason in drying the glue at all, is to preserve it for transportation and commercial purposes, it being in its liquid or jelly condition susceptible to atmospheric influences, under the operation of which it is more liable to be spoiled than when dried. It may be true, as claimed, that the adhesive qualities of glue before it is dried are somewhat superior to what they are after the glue has been dried, and then remelted for actual use. But this is merely a question of degree, and **the application of the glue soup, before drying cannot properly be called a discovery, such as involves the exercise of the inventive faculities.**"

For "glue soup" read "direct metal", and for "remelted glue" read "remelted cupola metal", and the Supreme Court has decided this case.

We also call the attention of the Court to the following Supreme Court decisions: *Wood Paper Patent*, 13 Wall. 566; *Blake vs. San Francisco*, 113 U. S. 679; *Burt vs. Evory*, 133 U. S. 349; *French vs. Carter*, 137 U. S. 239; and *Bussell Trimmer Co. vs. Stevens*, 137 U. S. 435.

Of the decisions of the other courts we refer to but two late cases. First, that of the *United States Mills Co. vs. Carnegie Steel Co.*, 89 F. R. 343, decided by Judge Acheson, subsequently argued in the Appeal Court, after which the present petitioners withdrew their appeal so that the case stands as controlling. The invention related to the use of aluminum in steel, and the defendants, the present petitioner, sought to find a difference in their use of the invention because the aluminum was introduced with the steel just produced in the converter instead of into the remelted steel, but the Court held (p. 348):

> "**The problem of manufacturing sound castings from wrought iron or steel is precisely the same, whether the molten metal is produced in the one way or the other.** It would be a **remarkable rendering** of the patent to hold that, in order to practice the invention, **it is necessary to let the molten steel from the smelting furnace get solid, and then be remelted.** Certainly the suggested limitation is not expressed in the specification or claim. The language used is broad

enough to cover molten wrought iron or steel, **however the molten condition is brought about."**

In *Falk Mfg. Co. vs. Missouri Railroad Co.*, 103 F. R. 295, decided by the Court of Appeals for the 8th Circuit, the method related to the joining of rails by means of molten metal fusing with the surfaces of the rails and binding them together. The case is interesting in two points, first in showing the proper interpretation of the broad term "molten metal", which is indicated throughout the case as meaning remelted metal, a portable furnace being stated as used to melt the metal ready for making the joints.

It is important, however, as giving probably the latest expressions of any of the Appeal Courts on the question of patentability arising from the supposed transfer from one art to another of a well known process. Where practically the same process had been used for joining the wrought metal spokes to the cast metal hub and tire of a car wheel, or to uniting two cast metal pipe, or to uniting the wrought steel bit forming the cutting edge of an axe with the cast metal body thereof, the Court held that there was no invention in carrying out the same process to join the ends of two wrought metal rails, even though for electrical railways there was peculiar advantage in the use of the invention in providing for the conduct of the electrical current along the rails.

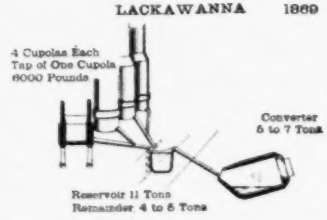
In conclusion, we submit to the Court that we have in the Whitney and other wheel foundry uses an absolute literal anticipation of the second claim of the patent and more than that, an anticipation in all substantial and material respects of any invention which by clear statement or obvious implication can be read out of the specification of the patent; and not the least important value, to the respondent, of these proven foundry uses is, that they completely destroy, as we have shown, the sole and only basis upon which the patent office was induced to grant the Jones patent.

The American Bessemer Accumulating Ladle.

This practice involving the use of a large reservoir ladle between the furnaces and converters, was the natural outgrowth of the Whitney and like foundry practice, and evidently developed from the same, as the car wheel practice was widely known and the headquarters of the Cambria Iron Company, which was interested in the first experimental Bessemer plant at Wyandotte, Michigan, in 1865, (Hunt, 289), were in Philadelphia close to Whitney's foundry on

Broad street. The litigation under the Whitney patent, commencing in 1867, (3 Fisher, 157,) and ending in the above case in this Court, was also a matter of common knowledge.

It was the regular practice in all American Bessemer works commencing at Troy in 1865 or '6, (p. 812); The Pennsylvania Steel Works at Harrisburg, and the Cambria Works followed soon after (p. 816). This accumulating ladle was a recognized part of the Bessemer plant from the first (p. 820). It was used at the Lackawanna Steel Works both for foundry and converter purposes (pp. 141–2).



All these different works had a number of cupolas to melt the metal for the coverters which were tapped at intervals, when the hearth was filled, into a ladle or vessel, the ladle being thus filled and holding a large surplus over a converter charge. The ladles were placed on scales to weigh the converter charge, and after it was withdrawn the ladle was refilled, from the cupolas, the fresh metal being tapped into that remaining in the ladle.

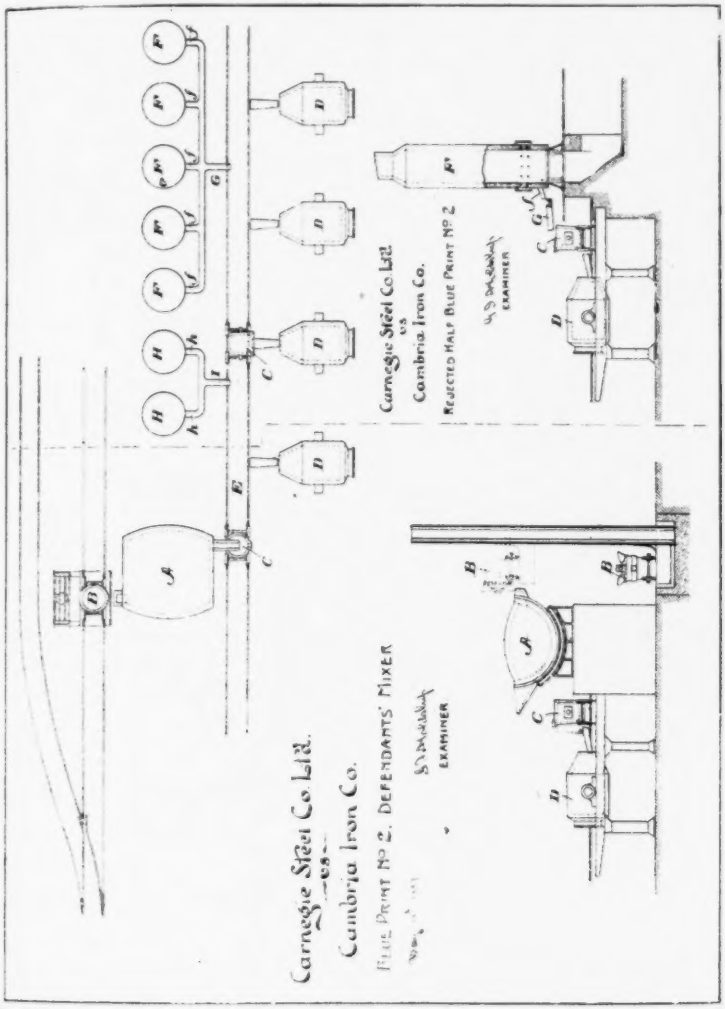
The ladle therefore served first as a storage reservoir to act as a balancer for supply and demand, and second, to mix and average up the fresh metal received from the cupolas with the mixture remaining in the ladle, giving more uniform metal for conversion. The Circuit Court of Appeals have held as to this as follows (p. 1122):

> "The record shows that the defendant's reservoir or accumulating ladle complained of is the same in principle as one which has been in use in the Cambria Works ever since Bessemer steel was first manufactured there, with only this difference, that at first it was used at cupola, now at furnace. The primary object has always been to permit the work of Bessemerizing to proceed without interruption, to furnish a receptacle for the molten iron of the cupola furnace when it was advantageous to tap the same, and thereby avoid too early tapping, as well as the necessity of being obliged to hold too long."

Referring to both cupola ladle and direct metal reservoir, they say:

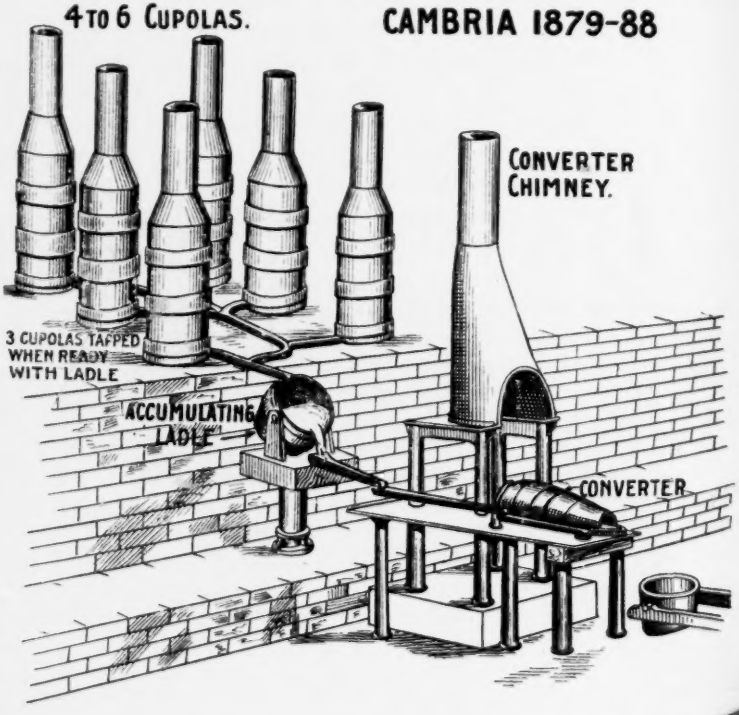
"Doubtless under the ordinary conditions there is a mixing of the molten metal when the partially filled vessel is replenished, but it is only such a mixing as is incidental to the pouring together of mixable liquids under the well-known principle of diffusion."

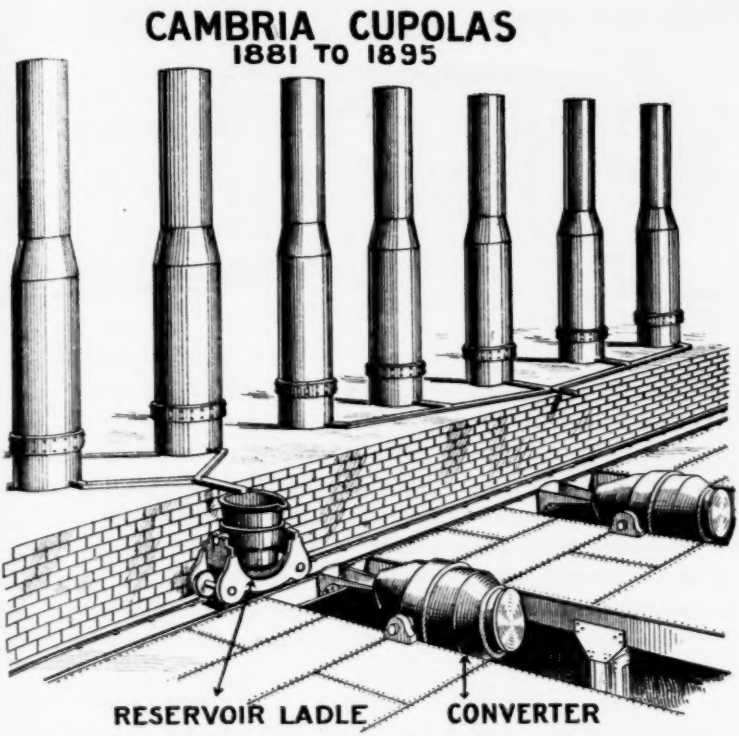
The pertinency of such ruling is made clear by examining the drawing of respondent's plant printed in the record, p. 35, and here inserted in the brief, where the two systems are illus-



trated side by side in the positions actually used by respondent, petitioner having refused to put in evidence the part of the drawing showing the cupola plant, evidently because it feared to be bound by it.

Respondent's cupola plant had grown from two cupolas in 1870 to seven, as shown. In 1894 they commenced storing direct metal from their six furnaces in their 300-ton tank (p. 426). The only difference between the two plants is that the cupola tappings are 3 to 4 tons at short intervals, while, as the blast furnaces tappings run up to 50 tons at long intervals, a much larger reservoir vessel to store the same until needed, is provided. The action in both cases is the same, metal as tapped from the furnaces being received in the reservoir and drawn from as needed for conversion; the metal of course mixing incidentally and being evened up according to the laws of diffusion, which, as petitioner's witness Metcalf says, were "always known ever since man began to observe nature's laws" (p. 652). We insert cuts of the several plants used by re-



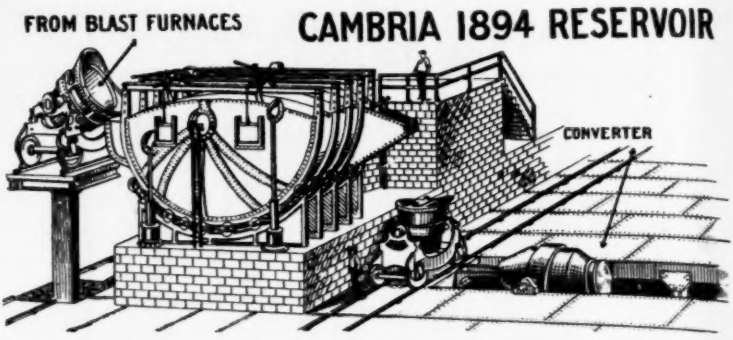


spondent, one from 1879 to 1888, next the cupola plant used from that date to the time of the suit, and the large storage reservoir for blast furnace metal which was added to that plant.

These facts are practically found by the Circuit Court. It finds specifically (p. 699) that storage and weighing were functions of the accumulating ladle, and gives quotations to show its use as a reservoir. As to the mixing the Circuit Court states (p. 697) that greater uniformity was desirable, though not an indispensible requisite, and further says (p. 698):

> "Now that mixing of some character took place in the ladle during these operations, that where it took place the resultant was a homogeneous average of all constituent ingredients contained, are facts to gainsay which would be to question nature's laws."

The question naturally arises therefore, why this was not held an anticipation in the Circuit Court. There are two answers; first,



that the mixing was "accidental, eccentric and non-systematic;" and second, that the vessel was not always well filled up and therefore it did not provide a **dominating pool.**

Petitioner's counsel raised the same objections, saying in their brief before the Circuit Court of Appeals (p. 92) that to make this practice an anticipation defendant must prove: *first*, that the tappings from the several cupolas were substantially diverse in character so as to be made perceptibly better for convertion by being mixed together, and that this fact was recognized; and *second*, that a substantial benefit in respect of mixing was obtained and known to be obtained.

Respondent's answer is well stated in the ruling of the Circuit Court of Appeals, namely, that it was the same reservoiring action as now practiced by respondent with blast furnace metal, and if it does not anticipate, respondent does not infringe? If the Appeal Court has properly construed the patent as requiring mixing to uniform standard composition, it is not an anticipation, but if it covers mixing to produce gradually varying charges to the converter, as distinguished from uniform standard composition, it is. Examination of the evidence should settle these points.

At petitioner's own works they had two 12 ton cupola ladles and two 5-ton converters (p. 773), having therefore storage for nearly two and a half converter charges. The sizes of the cupola tappings are not proven, but were probably 3 to 4 tons. Mr. Lauder, petitioner's managing director, says (p. 66), **"The ladle was never entirely emptied."** Mr. Gayley, their former superintendent who signed this petition, says (p. 58), "It was customary not to drain all the metal out of the ladle."

At the Pennsylvania Steel Works at Harrisburg, as operated since 1881, they had a 40,000-pound (20-ton) ladle, and the converter charges were from 14,000 to 17,000 pounds (about 7 to 8 tons), and the cupola tappings usually about 8,000 pounds (4 tons), (pp. 125 to 135). Martin, the Superintendent, says (p. 131) that

> "We invariably have from 5,000 to 20,000 pounds of iron in the ladle when we tap into it again from the cupolas",—

that is, to which the 8,000 pounds cupola tappings would be added.

The details of respondent's works at Cambria will be stated hereafter.

The Irregularity of Cupola Metal.

Petitioners urge that it must be shown that irregularity existed, that the metal would be bettered by mixing and that this fact was recognized. The record proves all these things beyond doubt.

We have shown above that the cupola metal was irregular even when carefully selected as for casting car wheels and for foundry practice, as stated by Kirk. The Bessemer practice had no such refinements, the record being full of evidence showing such irregularity; of the sixteen witnesses proving such irregularity, cited above in discussing the Whitney practice, petitioner's witnesses—Evans, (p. 92); Fry, (p. 508-9); Williams, (p. 487); and Metcalf, (p. 645), and respondent's witnesses—Hunt, (p. 219-2); Campbell, (p. 126); Wood, (p. 170); Price, (p. 328); Martin (p. 132); and Robeson, (p. 354), all refer to Bessemer metal. Martin, of the Pennsylvania Steel Works, says (p. 132):

> "The cupolas hardly ever melt alike in temperature; the new cupola always melts hotter, the coke being heavier or lighter, or perhaps not distributed alike. Therefore the receiving ladle, with 5,000 or 20,000 pounds iron in it, after pouring the heat into the converter, tends to mix the metal as the succeeding charge is tapped."

Capt. R. W. Hunt, who has probably the longest experience in steel making of any living American, and who was Holley's most intimate friend, describes the reasons for irregularity and says that the metal tapped from the cupolas **"would come into the ladle varying in character but in it be made more uniform."** (292).

Promiscuous Charging.

The practice followed in some works including respondent's, shows positive recognition of the facts that irregularity existed and was overcome by mixing in this ladle. The Circuit Court found the great irregularities of metalloids in the blast furnace metal and the causes of the same (p. 674–5), and that like irregularities would be present in the pigs cast therefrom is of course the fact, and is admitted by petitioner's witness Fry, (p. 506–507).

Though attempts were made under the old practice to grade the iron so as to get approximately uniform product from the cupolas, (and because of this practice petitioner has claimed that it was not absolutely necessary to mix this cupola metal to get sufficient uniformity for Bessemerizing), yet the evidence **proves the promiscuous charging of this irregular pig metal and the intentional use of the accumulating ladle to even it up,** and give metal sufficiently uniform for conversion. This has been the practice at respondent's works from 1881 down to the present day.

Practice at Respondent's Works.

C. S. Price, respondent's manager, states that in 1881 the practice of selecting the pig iron for the cupolas was discontinued, and that the metal coming from the blast furnaces was dumped into the stock and charged therefrom promiscuously into the cupolas (327.) The irregular metal coming from the blast furnaces was charged into the different bins and drawn from them without selection, and under such practice it was inevitable that one cupola would be charged with high silicon metal, another with low silicon metal, and all grades between, and no one could know the quality of the metal coming from any cupola.

From 1879 to 1888 the ladle capacity was 28,000 lbs. (14 tons,) the converter charge 15,500 lbs. (about 7½ tons,) leaving 12,500 lbs. (over 6 tons) in the ladle. The cupola taps of from 4,000 to 6,000 lbs. (2 to 3 tons) passed into and filled the vessel. (p. 327.)

Mr. Price tells us that the ladle was kept well filled up, (A 12, p. 327):

> "It was the custom to leave in the ladle an amount of metal equal to the difference between the converter charge and the full ladle capacity."

And again, (A 13, p. 327):

> "This ladle was again filled to its full capacity by re-tapping the cupolas."

He was asked (Q. 16, p, 328):

"Will you say whether there were any advantages attending this mixture, and if so, name some of them?

A. The metal from the several cupolas *necessarily varied from time to time considerably*, both in chemical and physical conditions; at times the metal being such **from one or two of the cupolas that in themselves they would be unfit for converter use.** But by the means which was afforded by the intermediate ladle, the metal from this one, or the two, cupolas, **would be averaged with the better adapted metal for converting from the others."**

Mr. Morgan, the mechanical engineer of the works, states (p. 400):

"Prior to the introduction of the reservoir for blast furnace metal we procured our molten iron from cupolas which were charged with solid pig iron **taken promiscuously** as it came from the blast furnaces and with suitable proportion of scrap. The metal from the various cupolas were tapped into the cupola ladle and **there mingled.** From time to time heats were drawn from this ladle, which was **refilled by additions from the various cupolas.** The number of cupolas and the use of the ladle in front of them secured the necessary preliminary mixing. The method of charging the cupolas is described in detail in the previous testimony of Mr. Price."

Mr. Cabot, the assistant superintendent from 1881 to 1884 says (p. 154) that this mixing was *done intentionally* and for the specific purpose, and was continuous over the years referred to, and says:

"The mixing of cupola metal at Cambria was accomplised by the tapping of a number of cupola furnaces into one large receiving ladle, from which converter charges were poured off and the supply in this ladle again **increased by further tapping.** The practice at the Bellaire steel works was similar to that. The purpose was to obtain a supply of metal for the converters to equalize the different streams of metal from the different cupolas, and that was its effect. It accomplished that."

Capt. R. W. Hunt had been manager there from 1871 to 1873 (p. 289) and when asked whether there was any recognition at that time of the mixing of the incoming metal with that remaining in the ladle of the advantage arising from it, he says:

"Very decidedly so. It was recognised as one of the great features of the intermediate ladle, that it *made the work so*

much more uniform in results from mixture or evening up of the various grades of pig iron used."

The same practice was generally followed by the Pennsylvania Steel Co., and though analyses were made of metal produced by their furnaces, in their rapid working the metal often passed to the converter house and was melted and converted long before the reports of the analysis were received, the metal being thus melted in the cupolas without sorting or analysis, that is, charged promiscuously as above stated, as described by Campbell (p.128). See also Martin (p. 133). Campbell tells us (p. 126) as to the use of the ladle:

> "It had the effect of securing considerable uniformity owing to the fact that there was a mixture of products of different cupolas, and even **when the cupolas were working in unlike ways their product would be averaged in the receiving ladle.**

Recognition of the Applicability of the Practice to the Treatment of Blast Furnace Metal.

This has been fairly shown in considering the prior art.

In 1874 Snelus, the well known English Bessemer steel manufacturer in the public printed discussions of the leading English metallurgical Institute, known to all large steel workers referred to the use of the American intermediate ladle, and advocated its use with blast furnace metal "to give better average metal". (p. 757).

In 1878 (p. 789-790) he again referred to the use of the intermediate ladle for blast furnace metal, and its important functions in storing the metal, and adds:

> "He thought himself that *the receiver was of considerable importance both for saving time and for facilitating the admixture of iron* and he was confirmed in that view by the idea of Mr. Frith of Bethlehem who was about putting up a thirty ton ladle, according to Mr. Holley, to receive the metal from the blast furnace and hold it in readiness so that at a moment's notice you could take your iron into the converter *and also obtain a better mixture.*"

As the use of the intermediate receiving ladle in the steel works did not differ in kind from the use of the intermediate ladle in the foundries, the Kirk publication, and the Engineering publications, cited and quoted from in our discussion of the foundry use, and the statements of the Deighton patent, are equally pertinent in showing published recognition of the mixing function of all such receptacles.

We have therefore shown the irregularity of the cupola metal, —and the recognition of the desirability of mixing it to give better metal for conversion;—and that by this mixing operation in the accumulating ladle the metal was *made more uniform and recognised as to be.* We have therefore answered all the requirements urged by petitioner in the Court of Appeals.

Circuit Court's Comments on the Cupola Ladle Practice.

While admitting that mixing necessarily took place between the remainder and the fresh metal fed to the vessel, the Court s main objection was that it was "*accidental, eccentric and non-systematic.*" This is negatived by the testimony throughout the case, and particularly by the practice in respondent's and other works just considered. It was *followed as the means* for unifying the metal; not to bring it to the high degree of uniformity of Whitney but to unify it sufficiently for Bessemerizing.

The Court's next objection was that it was *not recognized* as giving the advantage of unifying the metal. This is absolutely negatived by the above evidence as to respondent's practice,and that above cited showing recognition of the applicability of the ladle for mixing direct metal. The Court relies upon the evidence of men who have *shut their eyes* to what was going on before them,—the inevitable mixing, governed, as Metcalf says, "by nature's laws," and "known since man began to observe" the same.

The Court refers to the fact that Hunt and Holley did not recognize it as a mixing process. Hunt's testimony we have quoted above. The Court is also mistaken as to Holley, as, in describing the Vulcan plant, erected on plans made by him at St. Louis where they had two accumulating ladles for cupola metal and one for blast furnace metal, Mr. Holley said (p. 797):

> "This arrangement enables the convenient use of this metal in part and of cupola metal in part as may be made necessary by the insufficiency of smelting plant or *by the irregularity of blast furnace iron.* If the intention is to use chiefly blast furnace iron direct, the judicious use of a cupola (lined to a less diameter so as to run economically on a small product) *enables the manager to mix and temper his irons* much sooner than he could do so by the blast furnace alone, *and so to get a uniform steel.*"

In addition to this throughout the Holley 1877 report previously discussed in this brief (see pp. 143 to 157) Holley has re-

ferred to the different ways of mixing their regular blast furnace metal, namely, by the mixing of batches, or by storing in a large heated tank, the very practice followed by respondent and now complained of. There is not much comfort to petitioner in this.

The third objection raised by the Judge of the Circuit Court is that we have not established with regard to this intermediate ladle practice the persistent, intelligent use of a *dominating* residual pool in the ladle. That is quite true,—we never undertook to establish it,—and as no such dominant pool is described or indicated in the patent, it would have been in the highest degree an irrelevant fact.

The learned Judge makes a special point, (See bottom of p. 699 and top of p. 700) that when respondent enlarged its converter charge about 1889, it did not increase its ladle capacity proportionately, having a residue of only about one-fifth the full ladle charge, which was used instead of a residue of about one-half. That is, that while a residue was always provided for, the relative size of the residue was reduced.

The Court, however, made the mistake of comparing the size of the remainder with the converter charge when it should have been compared with the tapping from any cupola. The cupola tappings were from 4,000 to 6,000 pounds, as above shown, and the remainder of 7,000 pounds left in the ladle after 1889 was larger than the cupola tapping, and so came within the definition of petitioner's witness Kennedy (×-Q. 73, p. 466). "There should be as much left in the vessel before filling it as was added to it at any one time." A larger remainder than the amount added was always present. If the vessel contained 7,000 pounds, and the first tap of 6,000 pounds were added, it would then contain 13,000 pounds; and the next tap would be 6,000 pounds into 13,000 pounds, and so on until the vessel was filled, so that, as Mr. Price says, "Metal unfit for converter use" coming from the cupolas "would be averaged with the better adapted metal for converting from the others." (p. 328.)

The Smaller Residue May Give More Uniform Mixture.

His Honor, assumes, however, that the reduction in the proportional amount of residue was necessarily detrimental to the average mixture secured by the use of the ladle, but this by no means follows. Your Honors can readily see that much better results might be obtained by the use of a residue equal to one furnace tap than by the use of a residue equal to two or more such taps, because it would permit of adding one or more additional fur-

nace taps and so increase the number of portions mixed together, and by increasing the number of elements give greater opportunity for unifying the admixture, and so apply the "law of averages" explained so clearly by Mr. Carnegie in answer 32, page 435.

The figures quoted under the head of "The Crying Need" and showing that petitioner had abandoned the Jones method and employed its vessel particularly for its reservoir function (see pp. 131 to 137) demonstrate, as we believe, that the supposed dominating residue is not a factor tending toward uniformity but that where the vessel is filled and emptied not only does the reservoir provide a number of charges of identical admixture (with respondent's large reservoir, 25 such charges) but that the variations in silicon between the different fillings of the reservoir are not as great as the variations actually proven to take place between the successive converter charges in petitioner's practice with its vessel kept, as they say, well filled up. As shown on pp. 132 and 133, and illustrated by the diagramatic charts, the variations between the successive converter charges ran as high as .95 (or $\frac{95}{100}$ of 1%), and examples were found of differences as great as .86, .79, .74, .61—and often over .40; while these variations might be either up or down. When mixing batches containing ten blast furnace tappings, however, (as found on pp. 135 to 137) the variations between the different batches *each containing twenty-five converter charges* were far more uniform, the silicon in the successive batches running for example 1.61, 1.58, 1.52, 1.18, 1.35, 1.29, etc,, or to state the *differences* in silicon between successive batches .03, .38, .02, .17, .0¢, there being but one instance in such batch mixing where the variation was greater than .40 in silicon.

From the facts collated under that head it is shown to a demonstration, we believe, that the Circuit Court was not only mistaken in believing that the dominance of the residue was a limitation on the claim of the patent, but also in believing that a dominating residue when present is a factor tending to materially reduce the variations between successive tappings from the mixer, as contrasted with what would be the case if the mixer were alternately filled and emptied. The computations from the figures produced by petitioner's expert witnesses, show that exactly the contrary is the case; and that the presence of the dominating residue in the petitioner's practice was a factor materially increasing the amount of variations in successive converter charges.

The point to which such computations are directly relevant in this cupola ladle practice, is the ruling of the Circuit Court to the effect that the later practice of the respondent company in using remelted metal involving the use of a proportionately smaller residue than employed in its earlier practice indicates a lack of recognition or appreciation of the mixing function of the intermediate ladle. Your Honors will see that it does not involve such a conclusion and that **it is quite as likely that they obtained better results by diminishing the proportion of the residue as it is that they obtained worse results.** Moreover the computations submitted will, we think, satisfy Your Honors that when, in applying the intermediate ladle practice to the storage of blast furnace metal we *increased the capacity of our receptacle* from about 20 tons to about 300 tons and with the result of obtaining a much larger proportional residue, *it is not to be presumed that we did so with a view of obtaining a proportionately better mixture than we had with cupola metal, because, as a matter of fact, the change was not one made in the direction of uniformity or of avoidance of abrupt variations.*

Of course this respondent would be glad to use any legal expedient for preventing injurious variations in the composition of the metal used in the converters. Of course in their present practice, as in their past practice, they appreciate the function of the intermediate reservoir in, to a certain extent, equalizing the composition of the metal; but **as against the practice of any method which will secure a standard mixture, they are confronted with the necessity of storing their metal in large quantity,** and they are satisfied that as a commercial expedient it is better to pursue the old method of storage with incidental mixing than it is to sacrifice the feature of storage and assume the difficult, if not impracticable, practice of selecting and mixing the uniform metal to a standard composition, or the cumbersome practice which is clearly open to them of providing themselves with two mixers and alternately filling and emptying them.

In conclusion we submit that as we have unquestionably shown that this intermediate ladle involved in its regular mode of use the charging of ununiform metal from several furnaces into a receptacle containing a *considerable residue from previous charging* of the receptacle, and with which the incoming metal was mixed; and as we have unquestionable shown that this practice involved, and was recognized as involving, the double function of (1) storing the metal and thus equalizing the running of the producing and con-

vertical parts of the plant; and of (2) mixing the ununiform metal so that a better average metal was delivered to the converters than could have been obtained from tapping from separate furnaces,—we have placed before the Court facts which cannot be overcome by the theorizing of expert witnesses,—and, further, that the practice is identical with respondent's practice, and if respondent's practice is not to be distinguished from the Jones patent, it certainly anticipates that patent.

The Tabberner 1856 British Patent.

This patent, No. 2061 of 1856, for Improvement in Smelting Ores (Record, pages 963–5), so clearly shows the antiquity of reservoiring of blast furnace metal and all the steps practiced by respondent, that the whole defense might well be rested on it.

It includes a special way of entering the blast to give more rapid action in smelting the ores in the blast furnaces, which is irrelevant to the present issue; and also a second invention, which is described as follows:

> "The object and intention of this invention is, therefore, to dispense with the necessity for employing one or more large furnaces, and to use in lieu thereof several small furnaces, the combined capacities whereof are equal to that of one or more large furnaces, and to **cause these small furnaces to discharge their contents at short intervals of time into one large reservoir, from which the molten metal may be drawn for casting from.**"

The inventor's idea was—quick action of small furnaces and frequent tappings, the collecting of all the metal in one large reservoir, and the drawing from the molten metal as needed for casting. The only difference between this practice and respondent's is that as blast furnaces have increased in size the tappings are at longer intervals, while to supply the converters the reservoir is drawn from more frequently—all of which is a matter of degree.

That under this practice so clearly described, the charges of metal from the several blast furnaces would be irregular is made clear in Judge Buffington's opinion (pages 674–5), and hereafter shown conclusively in discussing anticipation by Deighton. That the ununiform charges would necessarily mingle is conclusively shown by petitioner's witness Metcalf, who says (p. 652):

> "You can't pour two metals together without making a mixture"—and again—"It is a single fundamental law of nature; I suppose it was always known ever since man began to observe nature's laws."

That under such practice the metal would be necessarily poured into a remainder and often a very large remainder governed simply by the laws of supply and demand, is beyond doubt; and is positively proven (Durfee, 234). Indeed the Circuit Court acknowledges this, saying p. 695):

> "Conceding, as respondent's expert claims, that Tabberner understood fully the art of mixing metals from a number of smelting furnaces in one large reservoir, from which the molten metal may be drawn for use as required (a general principle, as we may say, which has been recognized for years before) yet on the subject of maintaining and using the contents of the molten pool as a dominant and unerring agent for receiving non-uniform products and delivering an approximately uniform one, in other words, on the gist of the Jones process, Tabberner is silent."

This shows that the **Circuit Court recognized Tabberner as disclosing the ordinary reservoir action,** and that the only objection to it as an anticipation was its silence as to the disclosure of the dominant pool.

We do not believe the Tabberner patent is an anticipation, not for the reason referred to by the Circuit Court, but because, like the other reservoir practices described, it would not necessarily lead to a uniform standard product which Jones so clearly distinguished from the reservoir action disclaimed by him.

That Tabberner discloses the reservoir action is undoubted;—that the metal from the blast furnaces going into it would be irregular is undoubted;—that the blast metal would incidently mix and even up is inevitable;—that in practice the fresh charges would be poured into a considerable remainder from other charges is undoubted. All these the Circuit Court acknowledges. Such are the simple facts of respondent's practice, which is identical with Tabberner so far as mixing is concerned.

The Circuit Court also rejected Tabberner because it antedated the Bessemer process (p. 695). This is a unique reason, but this Court has decided differently. If Tabberner provided for storing the molten metal from the blast furnaces he provided a means at the hand of the Bessemer manufacturer for holding the metal where storing was found necessary, and for incidentally mixing the metal to even it up. That Bessemer, or Jones, or any other person, could not monopolize such method, is held by this Court in the Furniture Spring case above referred to, *Lowell Mf'g. Co. vs.*

Cary, 147 U. S., 623, where the Court commented on the fact that it was not until a short time before 1870, the year preceding the grant of the patent, that furniture springs began to be commonly made of steel wire, and then said, (p. 636):.

> "It was not until 1868 when the general introduction of Bessemer steel and open hearth steel affected a cheap substitute for iron, that the use of steel became general in the art in question. It was then natural that there should be introduced into that art methods of treatment which were well known as applied in allied arts."

The Deighton 1873 British Patent.

The Deighton British patent for "Manufacture of Bessemer Steel." No. 3672, dated November 11, 1873, sealed May 7th, 1874, (Record. p. 982-987) shows the entire invention of the Jones patent, if Jones covers respondent's practice of the usual reservoiring and incidental mixing of the metal. That is, if Jones covers this usual reservoiring, and the mixing of the metal to obtain an average composition for Bessemerizing, it is anticipated by the Deighton patent, which **relates to the same art,** to the **treatment of the same material** and in **similar apparatus,** and to secure the **same product,** namely, **Bessemer steel or metal of uniform quality.**

As to this the Circuit Court of Appeals has stated (p. 1122):

> "If the defendant's reservoir carries with it, by well-known natural laws, incidental mixing, it cannot be regarded as an infringement of the patent in suit unless, in addition to its function as a reservoir, it has in combination some additional element set out in complainant's process. If it be urged that the defendants by drawing from several furnaces the molten metal required to replenish their reservoir thereby obtain the average of uniformity sought by complainant's process, the answer is that in this respect the complainant's patent is anticipated by the British patent to Deighton, No. 3672, May 7, 1874, whose claim of invention was the placing of a vessel so as to receive the molten metal tapped from two or more blast furnaces to get a better average of metal which will be more suitable for making Bessemer steel or metal of uniform quality."

The Court of Appeals has, as we believe, taken this Deighton patent as a type of others showing just such reservoiring and mixing, such as the Tabberner English patent above referred to, and

the Snelus and Holley publications; this Deighton patent being a good type because it relates specifically to the mixing of blast furnace metal to average it up for Bessemerizing the identical use to which petitioners have tried to limit the Jones patent.

Admittedly the main object of the Deighton invention was the same as petitioners claim for Jones;—to provide a better average of metal for making into Bessemer steel "of uniform quality." It is also admitted that this is accomplished by mixing the metal coming from the different blast furnaces in a large receptacle so as to give more average composition, and that from the metal in this receptacle converter charges are withdrawn leaving a remainder in the vessel.

Respondent has urged that reading the patent with the knowledge of the art existing at that time, it clearly discloses all the steps of the Jones invention, and as above shown, the Court of Appeals has practically so held. The petitioner denies that it discloses a continuous process of pouring fresh charges into the metal remaining from the previous charges;—or the maintenance of the so-called dominant pool.

What Does the Deighton Patent Disclose?

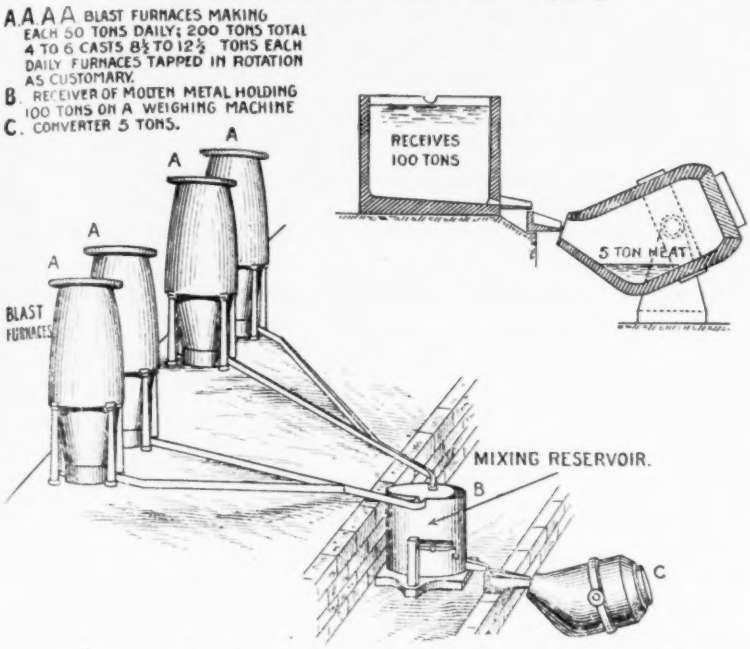
Considering the complete or final specification with its drawings, we find the invention was for "improvements in the arrangement and mode of working of apparatus for the manufacture of Bessemer steel;" that the purpose was to **"keep the plant or apparatus in nearly uninterrupted work, thus very considerably increasing the production with a 'plant' of comparatively little cost."** (p. 984).

The patent disclosed two ways of accomplishing this:

First. It provides apparatus for quickly changing the converters in case of stoppage from accident or wear, providing for the substitution of another one and the quick cooling of the one last used.
Next. It describes means for using the direct blast furnace metal in the converter, referring to Figs 4 and 5 of the drawing, which show the plant. This plant consists of four blast furnaces with runners leading into a large vessel placed upon a weighing machine from which the metal is to be tapped into the converters, and the patent says as follows: (p. 985.)

> "Instead of manufacturing Bessemer iron or steel from pig iron which has to be melted in cupolas my invention also consists in taking the molten metal directly from the blast furnace

DEIGHTON PATENT OF 1873


A A A A BLAST FURNACES MAKING EACH 50 TONS DAILY; 200 TONS TOTAL 4 TO 6 CASTS 8½ TO 12½ TONS EACH DAILY FURNACES TAPPED IN ROTATION AS CUSTOMARY.
B. RECEIVER OF MOLTEN METAL HOLDING 100 TONS ON A WEIGHING MACHINE
C. CONVERTER 5 TONS.
A
A
A
A
BLAST FURNACES
RECEIVES 100 TONS
5 TON HEAT
MIXING RESERVOIR.
B
C

to the converter, in which case I prefer to arrange the Bessemer plant in a line at a right angle to a row of two or more blast furnaces, **and place a vessel to receive the molten metal tapped** from two or more blast furnaces to **get a better average of metal which will be more suitable for making Bessemer steel or metal of uniform quality,** the vessel or receiver being placed on a weighing machine so that any required weight may be drawn or tapped from it and charged into the converter.

It then describes the apparatus in detail, describing the plant (p. 986) and stating that the receiving vessel

> "is placed low enough to give fall for the molten metal to flow from the blast furnaces to this **receiver** *m* which forms a **receptacle for mixing the molten metals** from two or more of the smelting furnaces. From the receiver *m* the **mixed molten metal is tapped** and flows down the swivel through *n* **into the converter** *a*. By placing the vessel *m* on a weighing machine it can be readily ascertained when the exact quantity required has been tapped from it into the converter."

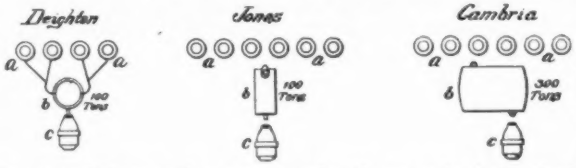
The claims of the patent referring to this are as follows (p. 987):

"Fifthly. The system or mode of arranging and working Bessemer plant in connection with **one, two or more blast or smelting furnaces,** substantially as hereinbefore described and illustrated by Figs. 4 and 5 of the drawings.

"Sixthly. The system or mode of arranging and working Bessemer converters with a **receiver or receptacle** (*m*) **for mixing the molten metal from two or more smelting furnaces to get a more uniform quality of metal,** substantially as hereinbefore described and illustraied in the drawings."

Examination of the drawings of the patent and comparison with the other parts well known to such a plant, shows that the receiving tank illustrated is of capacity of at least 100 tons (pp. 214; 266; 295; 369). Petitioner's witness Gayley admits (p. 560) that its storage capacity is greater proportionately than the storage capacity of the tank of the Jones patent.

Like respondent's practice, and in this different from the Jones patent, the Deighton patent is specifically and solely directed to the Bessemer art; and it provides an immense mixing tank or reservoir between the blast furnaces and the converters, and provides for the carrying of the metal as it is tapped from the converters through this intermediate vessel, where it is mixed or averaged up, as the patent states, "to get a better average of metal." The similarity of the three plants is shown in the following cut:



The Deighton patent is, however, like the Jones patent, (and in this different from respondent's practice), in that it had in view the improvement of the product of Bessemerizing,—that is, of the **steel itself,** (p. 985) that its purpose is "to get a better average of metal which will be more suitable for making **Bessemer steel** or **metal of uniform quality."** Its exclusive object was, however, improvement of the product in Bessemerizing, while Jones had in mind, as shown above, securing product uniformity, whether of steel, or **puddled iron,** or **cast iron.**

That this practice is a full anticipation of the Jones method see Forsyth, p. 267-8, A. 35 to 39; Hunt, p. 294-5, Q. 38 to 44; Durfee, p. 212-14, A. 311; p. 235, Q. 13; Morgan, p. 368-9.

In settling the one question in dispute as to whether Deighton discloses a practice requiring the successive replenishing of the vessel from which uniform charges called for by the patent are drawn, that is, pouring the same into remainder from previous charges, it is necessary of course to understand the state of the art of that date. Two things are to be noted: First, that the blast furnace practice as well as the metal coming from it was extremely irregular; second, that in using the blast furnace or direct metal for conversion, the custom was to tap the furnaces in rotation to maintain a supply.

Irregularity of Blast Furnace Practice.

The irregularity of the molten pig metal from blast furnaces in those early days is shown throughout the case and commented on in the Circuit Court, pp. 673–5. The record, however, shows *irregularity in the practice as well as the product*, such as the times of feeding and tapping, which makes clear that the blast furnaces were not tapped according to clock work. The times of tapping were necessarily irregular.

Petitioner's witness Gayley, in his article on The Development of American Blast Furnaces with Special Reference to Large Yields, (pp. 1065–1116) gives a good statement of the causes of such irregular working. For example, (p. 1071,) it refers to a change in the construction of the furnace stack by which larger outputs could be obtained "with less irregularity of working." It shows (p. 1073) that reduction in the air blast was "inevitably met by great irregularity in the working of the furnace;" and (p. 1074) that when a certain carbon coating was formed on the interior of the furnace walls it "worked far more regularly and economically," but the coating was so unstable that it might be dissipated in a week or so. Coke had proven a better fuel because the furnace was controlled "with more ease and less risk of scaffolds and chills" (p. 1085). Scaffolding meant the arching of the contents of the furnace which prevented their natural descent and led to irregular working. Chills meant the chilling or cooling of the metal in the hearth. On page 1087 he refers to the liability of the walls cutting out in the pockets in which material would gather and slide or slip into the hearth and chill it.

Other persons present discussed the same difficulties. Mr. Potter of the Illinois Steel Co., (p. 1094) referred to the sticking

and hanging in scaffolding until the furnace had cut its own lines. Mr. Kent, of New York, said (p. 1103) that "owing to some temporary stoppage or some accident, the furnace suddenly changed" its rate of working and reduced its production, and that too, when "there was no other change at all." Mr. Gordon, of Philadelphia, said (p. 1108). "It often happened that even with slight changes apparently great disturbances were produced."

In Turner on Metallurgy (p. 132) we find comments on moisture leading to irregularity; and again, (p. 144) the statement "the greatest variations are caused by irregularity in filling, due to stoppages at meal time, or for other purposes, and subsequent rapid charging to make good the deficiency." He refers (p. 145) to irregular descent of the charge; and (p. 98) to change the contour of the furnace and variation in driving, rapid driving causing rapid wear of the walls and scaffolding.

From the above it is conclusively shown that there **must have been irregularity in the times** of tapping the blast furnaces, and that the metal coming from the furnaces varies in quantity as well as in quality.

Tapping the Blast Furnaces in Rotation.

From the early use of direct metal in Bessemer steel manufacture, such as at Terre Noire, France, commencing in 1867, (p. 750) the custom was to tap the furnaces to keep up supply to the converters. As this practice was followed in England, for example, at Barrow, where they had fourteen furnaces, they took the metal from these furnaces as they were found to be ready, to keep up supply for the converters (p. 786) tapping one at a time, and having a special train for carrying the metal.

Petitioner's witness Gayley says (p. 560) that tapping the furnaces in rotation to secure a practically constant supply of metal has been generally practiced "as far back as the beginning of direct metal practice," and that was the practice followed at Edgar Thomson's for five years before the Jones invention. This being confirmed by Kennedy, (p. 461) saying that their object was "to send the iron as uniformly as possible to the converter works."

The blast furnace output of the early 70's was about 50 tons per day. See petitioner's witness Gayley (A. 241, p. 559); Capt. Hunt, (A. 44, p. 295); Morgan, (p. 369). The tappings usually occurred about every 6 hours, (p. 559); the converter charges of that day were about 5 tons (p. 559).

Deighton Patent Interpreted by the Knowledge of the Prior Art.

The fact that the vessel is placed upon a weighing machine, and provides weighed charges shows that a remainder is necessarily left in the vessel in ordinary operation, which would be present to mix with any metal which would naturally come from the blast furnaces. Mr. Morgan tells us (p. 369) that in the normal use of such receiver, metal from that blast furnaces would be tapped into that remaining.

Where the practice was, as above shown, to tap the furnaces in rotation as far as possible to keep up a supply for conversion, and this well known practice was followed, it would lead inevitably in working as in the manner described by Deighton, to feeding the first charge into a body of metal remaining after converter charges had been withdrawn. Otherwise there would be no mixture whatever. If there were four furnaces, each tapped at intervals of 6 hours, or 4 times a day, and tapped in rotation, one tapping would normally come every hour and a half, and to obtain the average marked out by Deighton and get a general average of metal for Bessemerizing, it must mix with the residue in the vessel. This should settle the question conclusively.

Further, if, as above shown, the practice was irregular and furnaces would be delayed as to time of tapping, it being customary to tap the furnace when the hearth was shown to be full; in following the practice made necessary by such irregularity it would also be inevitable that the charges as they would naturally come from the several furnaces would be tapped into remainder from previous charges.

The patent itself makes clear the intention of mixing different charges from the same furnace, as shown by the 5th claim, where it claims the invention as usual in connection with "**one,** two or more blast furnaces," it would be impossible to carry on the mixing process with one furnace, unless the charge drawn at one time from that furnace were tapped into remainder from previous charge or charges. Deighton as to this point corresponds directly with the Jones patent where he proposed to mix the metal taken "from the same furnace at different casts, or at different periods of the same cast" (p. 872, ls. 8–9). If such practice was to be maintained and to keep the plant in uninterrupted work, it necessarily describes the very thing marked out by the Jones patent.

This is still further shown by Deighton's statement that his object was to "keep the plant and apparatus in nearly uninterrupted work." To accomplish this he was particular to provide extra converters ready to be substituted in a few minutes by means of overhead cranes, as one step to this end; and the other means was to keep up supply of suitable mixed metal ready for converson, so the plant was kept steadily running.

The practice of filling and emptying the vessels which petitioners try to read into the Deighton patent would make this impossible. It would mean that the vessel must be filled from the furnaces, the converters standing idle until the different furnaces had delivered their metal into the vessel, and then that the vessel must be emptied by withdrawing converter charges before any more metal could be tapped from the furnaces. Such practice would have been absolutely impossible, and obviously absurd and unreasonable.

That Deighton intended to keep up a continuous supply of metal for Bessemerizing is further shown by his statement (p. 986, l. 32) "When the vessel *m* requires repair it is replaced by another "kept ready for use." While Deighton, like Jones, thus shows the desirability of a second vessel, it is not the intention to use the two vessels at one time, which would be the natural course in case the vessels were being filled and emptied, as petitioner alleges, was the practice intended by Deighton. It is only when one vessel requires repair that the other is brought into use, though it is kept ready for the purpose, being thus another step to Deighton's main object of keeping the plant in nearly uninterrupted work. The fact that but one vessel is used at a time is strong evidence that the practice was to be a continuous one.

Practical Working of Deighton Plant.

The next fact to be considered is the size and capacity of the furnaces and receptacle indicated in the Deighton patent. Deighton lived, as the patent shows, in the County of Cumberland, and Mr. Morgan (p. 369) states that at the scale of one-eighth of an inch, the evident scale of the Deighton patent drawing, the converter shown would be a five-ton converter, "the size most in use at that date in that district," and the mixing receptacle would be a proper size to hold 100 tons of molten metal, and says further:

"This is over 20 heats of the converter shown on the drawing, and probably equal to one-half the daily product of four blast furnaces of the size in use at that day, blast furnaces at that time rarely producing more than 50 tons each per day in the West Cumberland district.

As an engineer, I would say that this was a liberal amount of storage, both to accomplish mixing and to provide for emergencies in working blast furnaces or converters."

In accordance with the usual custom of tapping the furnaces every six hours, the furnace taps would be about 12½ tons, as above indicated. It follows that, to fill, or substantially fill Deighton's receiver, would require half a day's work of his full plant of four producing furnaces, and would require each furuace to deliver at least two taps into the receiver. At that date with an English Bessemer plant having two five-ton converters, the normal output in twenty-four hours was 12 to 15 blows or operations, as shown in "Jeans on Steel", p. 368. In America where they used the intermediate ladle, they made about 20 blows. With Deighton's large metal supply and his facility to change the converters, made, as above shown, in order to keep the plant in almost uninterrupted work, they might have run up to 25 blows. At this rate, if the vessel had been even three-fourths full, it would have **required over half a day to empty it,** and during that time, according to petitioner's theory, no metal whatever from the furnaces could enter the vessel, **though the furnaces would have been ready to tap for five or six hours and would be full to overflowing,** so that the metal would rise into the tuyeres where the air blast enters and, by choking them, stop the entire operation. Such treatment of the blast furnaces would lead to grave disarrangement in their operation if not to their entire disablement.

It is not reasonable to read into the Deighton patent a practice leading to such result. It is negatived by the prior art of tapping in rotation,—and by the impossibility of tapping the furnaces all at one time on account of the irregularity in their action —and by the patent itself, the object of which was to keep the plant in nearly uninterrupted work, and which provides that the method may be practiced with one blast furnace.

This is also further shown by the statement following the reference to two vessels. "When from any cause the converters "are not at work, the metal from the blast furnaces must be run in- "to pigs," etc. As shown above it would have been impossible to

hold the metal in the furnaces long enough to follow the filling and emptying practice which petitioner reads into the Deighton patent, and the only other course would have been to tap the metal from the blast furnaces into the pig beds while they were waiting for the vessel to be emptied by the converters. Yet the patent states that such pig beds are *only to be used* when "the converters are not at "work." There is no suggestion of the use of the pig beds when the plant is running normally.

That Deighton's large mixing vessel was intended to work as a reservoir, is also shown by the common practice in all molten metal plants, such for example as the Car Wheel Foundries of America; the Bessemer mills of America and the plant described in the Tabberner patent above referred to. Patents are addressed to those skilled in the art, and with this knowledge before them, they would clearly understand that where Deighton refers to tapping out weighed charges, necessarily leaving a remainder, he expects his vessel to be filled with metal as it naturally comes from the furnaces, and that though it does not describe tapping into such remainder, that is to be understood.

There is nothing in the Deighton patent, or in the Bessemer practice of his day, requiring or suggesting the exclusion of furnace metal from his *partly emptied* vessel. The vessel was to hold and mix the metal from the furnace, and the obvious, natural and only reasonable, practice would be to tap each furnace, when ready, into the vessel, if there was room for the metal therein. Such is respondents practice and no other practice is admissible under the varying delivery of furnaces and varying demand of converters.

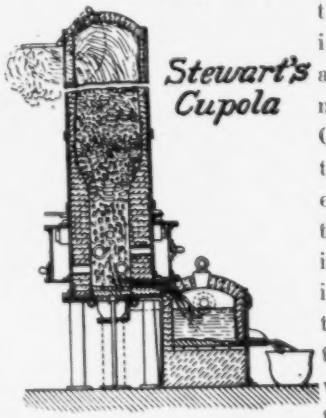
We therefore submit that Deighton discloses as a means of averaging up the metal and giving more uniform mixture for Bessemerizing (Jones' identical purpose, as petitioners claim,) the steps of tapping the metal from one or more furnaces into a large mixing receptacle—removing portions only of the same for conversion,—and, as read by the art of that day, feeding fresh charges into the metal remaining in the vessel.

Petitioner's Treatment of Deighton.

Petitioner endeavors to so cover up this Deighton plant with objections as to wipe it from the thought of the Court. An amazing number of points of distinction between it and the so-called Jones invention were evolved and pressed with energy and

ingenuity both by their expert witnesses and learned counsel, in the Courts below. Deighton's mixing receptacle was open at the top while Jones' was covered;—Deighton's mixing receptacle was tapped from the bottom, while in the Jones plant the metal was poured from a spout;—Deighton's drawing showed the metal coming to the vessel from the furnace through troughs, while Jones showed the use of ladles for the same purpose; Deighton poured into his furnace a whole tap at one time, while the Carnegie practice was to divide the tap into portions carried by separate ladles. Much of the testimony referring to these points, treats the Jones patent as though it were for an apparatus instead of a method, and ignores the express statement of Jones that his process could be carried on in any kind of receptacle, even a charging ladle (p. 1, ls. 82 to 85). As, however, the patent is for a method or process, differences in the apparatus designed by the two patentees are absolutely immaterial.

The objections urging the fact that the Deighton vessel was open at the top and might lead to sculling are answered by the fact that a cover or lid was old and in common use at that time being shown in the Hainsworth patent No. 283,110 (page 934), on which Jones' broad claim for a covered vessel was rejected in the prosecution of his apparatus application (page 739); the Whitney ladle being originally covered, though it was found unnecessary (p. 121); the Lohage patent showing a covered storage tank (p. 895); the Stewart Cupola (p. 850; drawing old page 1405) had just such a covered reservoir to receive the metal; while petitioner's witness Gayley admits that a cover is the the natural and obvious expedient (p. 563).——— As to the tapping of the vessel from below instead of tipping, this is shown in said Hainsworth patent, and the question was solved as a matter of course by Holley (p. 846) when he noticed the same objection to the Moss Bay apparatus, and advised the use of a tipping reservoir, such as Jones himself afterwards used.——— The use of carrying ladles instead of



Stewart's Cupola

troughs, or the two interchangeably, were well known in the 70's in connection with Bessemer practice, the vessel being tapped into carrying ladles at the Terre Noire Works, and throughout all the English practice.

The fact that Deighton did not select the metal in molten state but ran the whole tap into the vessel is a distinction from Jones, because it prevented possibility of selection of the metal entering the reservoir, and therefore might prevent the mixing of the metal to uniform composition, above shown to be the Jones invention.

Treatment of the Deighton Patent in the Circuit Court.

It is evident that the Judge of the Circuit Court recognized the storage function of the Deighton patent as accomplishing just the result above indicated, namely, the taking of the full taps into the furnace, because after fully considering the patent the Court held that it afforded means for storage and weighing and in that point was like the Holley receiving ladle (p. 692). As to this, we agree with him, though Deighton differs from both the Holley ladle and respondent's practice in that with him *mixing was the main point and storage incidental* and not described, while with the Holley receiving ladle and defendant's practice *storage is the main point and mixing incidental.* Deighton differed from the Holley ladle, however, in that as the tappings from the blast furnaces were many times in bulk the tappings from the cupola, the storage vessel was much larger and the bulk of metal normally remaining in it necessarily much larger.

The main objection of the Circuit Court is, however, that Deighton does not disclose the dominant pool. For instance the Court says (p. 692):

> "That some mixing was incident to the practice is true, for mixing is a recognized operation of nature where two or more quantities of fluid are run together, but as we have said, mixing ending with mere mixing is not the Jones process, *its gist is in using that mixture as a dominant intermediate pool to tone or transform eccentric incoming charges* into approximately regular graded outgoing ones. Thus it will be seen that while Deighton's patent was a possible step forward, he wholly failed to reach, much more to disclose, the *vital point* of the Jones patent."

The Court does not reject Deighton on the ground that it does not describe the process of mixing to produce a better general

average composition, but because the dominant pool made the chalk line to which all anticipations must fit, is not made clear. Whether Deighton's pool was dominant or not is immaterial. We have shown above that in its use there would inevitably be a good body of metal remaining with which the fresh charge would mix, and working as above indicated where the vessel held over a half days' converter charges, we believe a large pool would be continuously maintained.

As, however, this is not an essential of the Jones invention and the claim simply covers withdrawing charges without emptying or draining the vessel and feeding in a fresh portion, the question whether what the Court calls a "dominant intermediate pool" or a residue less than half the capacity of the vessel was present, cannot affect the case.

The undeniable fact is that Deighton saw the trouble resulting from the use of the irregular blast furnace metal of his day. He sets out the evils in nearly the same words as Jones, and as a remedy provides, like Jones, the intermediate mixing reservoir to accumulate the furnace metal and deliver it in measured charges to the converters as demanded. If this is not what is claimed in the Jones patent it is at least what is practiced by the respondent company, which simply uses the vessel described by Deighton in the same place and in the only manner in which it can or could be used under the practical every-day conditions attending the operation of the furnaces and converters of a Bessemer plant.

The Witherow Patents.

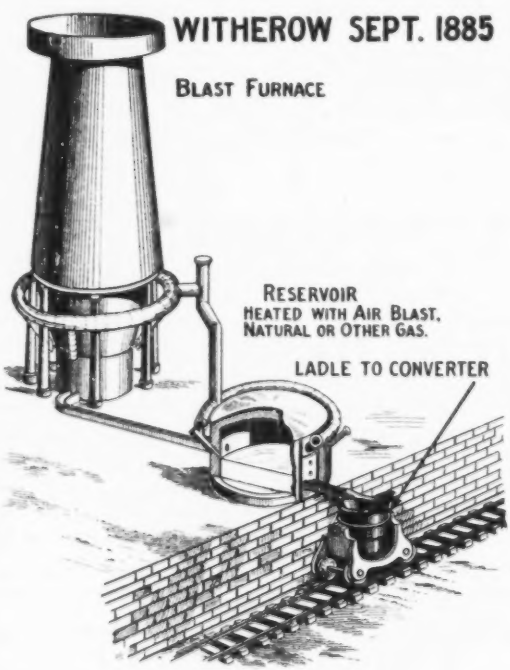
Both these patents, No. 315,587, of April 14, 1885, and No. 327,425, of Sept. 29, 1885, (pp. 941–945) are for apparatus or plants for the manufacture of iron or steel, and refer specially to the Bessemer practice. Each patent shows a blast furnace, an intermediate storage vessel and a converter. Neither patent refers to the mixing or evening up of the metal.

It was in view of these patents and the Kirk publication that the Jones application was amended, as fully discussed before, and the Circuit Court of Appeals refers to them in showing that the main stated feature of the Jones invention, in the application as filed, was for storing the metal, and that in view of these Witherow patents and the Kirk publication, the invention was *limited to the peculiar mixing to obtain uniform composition* (p. 1121).

The understanding of Jones and his attorney as to what these patents cover is shown in the argument filed in prosecuting the Jones application (p. 726), where, as to the latter, Mr. Bakewell said:

> "The purpose of the Witherow patent No. 327,425 is to **receive and store the molten metal for the purpose of preventing the detention incident to the necessity of discharging the contents of the blast furnace when there is no converter ready to receive it.** The idea of the patent is not to mix metal gradually, etc."

So far as storing the blast furnace metal to hold it ready for conversion, these Witherow patents, and certainly the latter one, No. 327,425, have thus been recognized as showing that the storage of metal to maintain supply for the converter was old. It has been respondent's contention, and this was apparently recognized by the Circuit Court of Appeals, that the **incidental mixing of different charges from the blast furnaces would inevitably take place** in the use of the vessel, and that therefore its practice is identical with respondent's here complained of.



The accompanying cut shows the plant and makes clear the operation. The patent states as follows (p. 944):

> "The metal is usually tapped from a blast furnace once in every six hours, and the quantity thus cast is many times in excess of the charge of a converter. * * * The charge of a converter is from one to five tons, and the cast of a blast

furnace usually runs from ten to fifty tons. * * * The time between charges of the converter is usually twenty minutes and upward, and the metal from the furnace must be kept in condition to be tapped from time to time into the converter as needed."

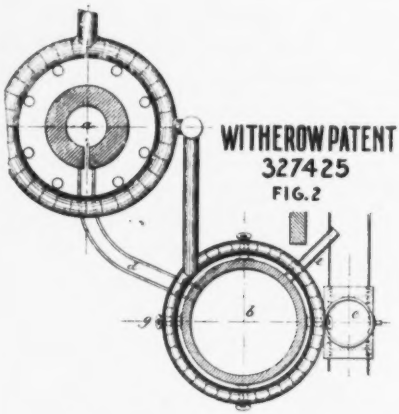
With this general object in view he describes his large storage receptable as designed "to receive and hold **the entire cast** of the furnace *a*, being of sufficient size for that purpose." He describes the maintaining of the storage chamber hot by use of natural gas or other means, and that it is provided with a number of tap holes so that metal may be withdrawn from different heights into the ladle carrying it to the converter. The first claim covers "a storage receptacle * * * for receiving and holding the fluid cast of the furnace" in connection with the ladle and blast furnace. The second claim is for "A storage receptacle for containing and dispensing fluid metal" etc.

Petitioner's Objections to Witherow.

Petitioner's objection to the patent, in addition to the fact that mixing is *not described*, has been the allegation that it was intended to fill and empty the storage chamber. This is negatived, however, by the fact that it is described as a *storage receptacle*, that it is intended to hold the entire cast of the furnace and its purpose is to contain and *dispense* the molten metal. All these terms make clear the fact that reservoir action is intended. To "store" is to "lay up a supply," and Witherow makes clear that the object of his invention is to maintain a supply of blast furnace metal because the furnace should be tapped only once in every six hours, while converter metal is needed every twenty minutes.

The above discussion as to the Deighton patent makes clear that it would have been impossible, in providing metal for the converter every twenty minutes, to have perfectly timed the tapping of the blast furnace and converter so the vessel would be emptied at the proper time to receive the blast furnace charge.

A **conclusive answer,** however, as to this is found in the drawing; for example in Fig. 2 here reproduced, the size of the blast furnace hearth or crucible *a* and the storage vessel *b* indicates that the inventor's purpose was to provide large storage room and that the *entire cast* which it was to receive and hold was any metal which might come from the blast furnace in its natural running, whether



the storage vessel was empty or not. Calculation of the size of the hearth, measuring it up to the tuyeres as shown in Fig. 1, and the natural depth of metal in the storage vessel shows that the holding capacity of the storage vessel is about four and one-half times that of the hearth. If the furnace taps were 50 tons its capacity would be over 200 tons. The illustration of such large storage capacity makes clear that the inventor never intended that the vessel should only hold a single tapping from the furnace.

Such practice even with the single blast furnace shown fits in with the Jones patent where he states (page 872, line 8) that it is intended to include metal taken "from the same furnace at "different casts, or at different periods of the same cast, and "subject the metal before its final refining to a process of "mixing."

That it is clear from the above facts briefly stated that there would be, in connection with the storage of the metal in the Witherow plant, the same incidental mixing as fouud in the respondent's plant is proven by the different witnesses testifying on the subject. For example, Mr. Forsyth, of the Illinois Steel Co., a student of Holley and one of the best known steel manufacturers of the country, says in regard to this (A 41, p. 269):

> **"Proportionate sizes of blast furnace hearth and of the receptacle** as shown on the drawings indicate that a large receptacle was intended to be used. Inasmuch as the receptacle will hold at least an entire cast, it is evident there would be a mixture in the receptacle of the portions of the cast flowing successively from the furnace hearth. It is also evident that unless the metal was taken from the receptacle with sufficient rapidity to empty it between the time of furnace casts that a second cast would be mixed with that already in the receptacle. *In Bessemer operations delays are constantly occurring which would make this mixture of two or more successive casts from the same furnace take place necessarily.*"

See also as to this Hunt, Q. 66-7, p. 303; and Morgan, p. 376.

The above patent has been referred to, not as disclosing the invention that Jones really patented, namely, mixing to obtain uniformity of the molten pig metal, but as showing that intermediate storage plants of large capacity between the blast furnaces and converter were well recognized expedients, and further showing that in the storage of the metal clearly pointed out and provided for by Witherow there would necessarily be the mixing of incoming blast furnace metal with that remaining in the vessel which is incident to any storage plant, so that if the respondent infringes, Witherow is a clear anticipation.

Patentability.

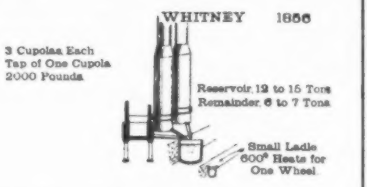
If molten metal means molten metal;—and if we are to answer Jones' claim instead of the Carnegie practice;—and if uniformity of product, whether of steel, puddled iron or cast metal was the object aimed at;—then it is not necessary to consider patentability because Whitney, Altoona, and Kirk,—and, if the incidental mixing of a reservoir is included, the Bessemer ladle practices absolutely anticipate.

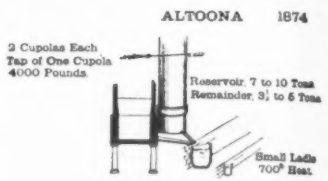
If, however, the Court believes the patent is capable of a construction which would cover respondent's storage with incidental mixing, then the Tabberner patent, Bessemer ladle practice, the Deighton patent, the Holley report, and the Snelus disclosures anticipate every point of the claim.

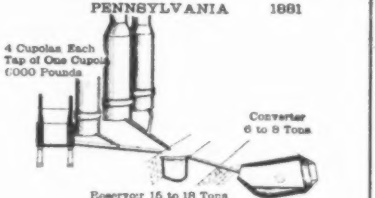
In the remote possibility of this Court's accepting the refined Carnegie practice as the scope of the patent, as held in the Circuit Court, we confidently submit that in view of the interchangeability of direct and remelted crude metal; of the undoubted use of a remainder constituting a dominating pool with the remelted metal —and the clearly proven practice of carrying metal, there is not the slightest basis of patentable invention to be found in the Jones patent.

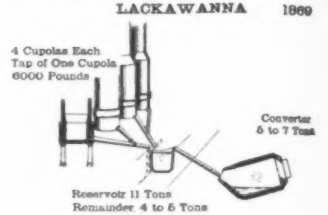
That a graphic summary of the main uses or publications of cupola and direct metal may be obtained we append the accompanying cuts, showing by diagram and statement the prior use and comparing the same with the Carnegie, or so-called Jones, practice and the Cambria practice.

Cupola Molten Metal.





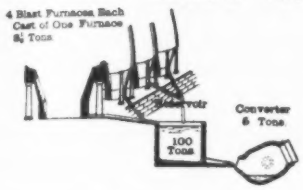




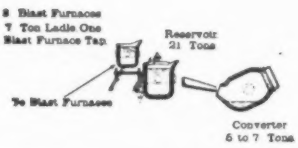
The irregularity of cupola metal for the purposes intended has been fully developed in connection with Car Wheel and Bessemer Ladle practice. The equivalency of the two metals as found in literature and proven by numerous witnesses has also been made clear. The identical use of the metals even in producing Bessemer steel, where, sometimes direct metal was used, sometimes cupola and sometimes a mixture of the two has been shown, such as in the Rhymney practice, (p. 806) the Vulcan works practice, (p. 795) the Snelus statement (p. 757), Holley report (p. 842); while it has been shown that Jones himself, on the same day he swore to the method application, swore to his machine application, tying the two metals together as intended to be stored in the reservoir and including them as "molten metal;" and further that petitioner itself and other users of the so-called Jones process, mixed the two metals in their reservoirs.

Blast Furnace Molten Metal.

DEIGHTON 1873

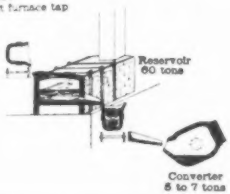


SNELUS 1874-77

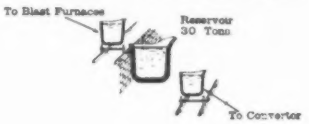


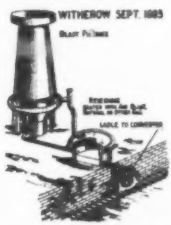
4 Blast Furnaces
7 ton ladle
One blast furnace tap

MOSS BAY 1877



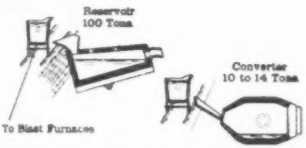
HOLLEY—SNELUS—FRITZ 1878
Intermediate Receiving Ladle





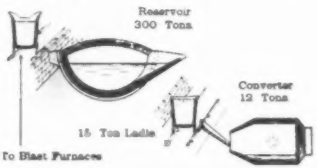
10 Ton Ladle
Blast Furnace
Tap 60 to 100
Tons

JONES 1889



20 Ton Ladle
Blast Furnace Tap
20 to 40 Tons

CAMBRIA 1894



The prior use of reservoirs for molten metal and other purposes and their natural and undoubted use where the metal or other liquid was poured into a remainder has been made absolutely clear; and that they were employed for storing large bodies of molten metal and even blast furnace metal, just as defendant employs its reservoir, has been made absolutely clear. That such reservior

action would necessarily give incidental mixing is admitted by the Circuit Court, and that is the mixing, and the only mixing, proven as to respondent's plant.

The necessity for these large reservoirs and their increased capacity keeping pace with the increased output of blast furnace metal, from 50 tons in 1872 to 300 or 400 tons in 1887 to 1890, and the fact that the reservoirs correspondingly increased from the single ladle holding a full cast at Terre Noire up through Snelus 20-ton ladle, Fritz 30-ton ladle, Moss Bay 60-ton reservoir furnace, Deighton's 100-ton reservoir, has also been shown. It also appears that as the casts increased they were necessarily subdivided into separate ladles which, like buckets, were of practically fixed capacity, so that even the peculiar limitation of subdivision of the cast is here found.

We are at a loss to find any distinctive point of difference between Jones and this prior art. The only possible point was in providing a tilting covered vessel of large capacity (though Deighton and Moss Bay had provided as large vessels) and of peculiar shape leading to the agitation of the metal which we freely admit was a fine engineering feat, but which is covered by his machine patent and which this respondent does not use.

He was certainly not the first to provide an intermediate storage reservoir for either blast furnace or other metal;——nor the first to mix metal to average it up and give uniformity either of product or of the successive charges withdrawn; nor the first to receive successive additions into the reservoir;——nor the first to withdraw successive charges, leaving a considerable or even dominating remainder;——nor the first to add a relatively small addition to the remainder and through the large mass remaining, even it up and obtain more uniform withdrawals;——nor the first even to Bessemerize the withdrawn metal.

No New Principle Is Shown.

The mixing is admitted to have taken place according to the law of diffusion, being a "fundamental law of nature, always known since man began to observe nature's laws." Indeed, petitioner's witness Kennedy admits that there is not a new step present. (p. 470).

There Is No New Result.

If uniformity of product or of successive charges was the object, even greater uniformity is found in the car wheel practice. If it is gradual non-abrupt non-uniformity, as the Circuit Court held, in the reservoir practice of the American Bessemer ladle, and that described by Deighton, Snelus and Holley, where the metals were not selected so as to give a standard composion, but the reservoirs were used in their natural way, even this peculiar effect, (not described in the patent) was found.

No Distinctive Point.

The decisions of this Court, and other Courts, make it necessary, to support patentability, that there shall be **some distinguishing point not suggested by the prior art** which places the patented invention in a different position from anything previously done. The above summary shows that Jones occupied no such position; the best that can be said for him from a practical standpoint being that as furnace production increased, and converter capacity increased he increased reservoir capacity, and in doing so got up a bigger movable tank than had previously been used, though movable reservoirs of *as large capacity relative to output were known.*

The decisions collated by the Supreme Court in *P. R. R. vs. Locomotive Truck Co.*, 110 U. S., 490, to the effect that the application of an old process or machine to a similar or analogous subject, with no change in the manner of application and no result substantially distinct in its nature, will not sustain a patent, even if the new form of result has not been contemplated (494) apply directly to this case and a long review of those decisions is not considered necessary. But one or two need be referred to further.

For instance, in *Miller vs. Force*, 116 U. S., p. 22, where a certain process had been applied at a different stage of manufacture, just as might possibly be said in the treatment of direct metal instead of cupola metal, the Supreme Court says:

> "What more did they do, at most than to apply a process of stamping tobacco, which was already well known, to the same tobacco in a later stage in the process of manufacture? Did this entitle them to a patent? According to the ruling of this Court in *P. R. R. vs. Locomotive Truck Co.*, 110 U. S., 490, this question must be answered in the negative."

The doctrine laid down as to analogous use in *Brown vs. Piper*, 91 U. S., 37, applies directly to the the present case. The patent

was for a method of preserving fish and other articles in a closed chamber by means of a freezing mixture having no contact with the atmosphere of the chamber. The anticipation was urged by a structure intended as a corpse preserver. The purposes for which the two structures were applied were widely different, but the Court said:

> "This was simply the application by the patentee of an old process to a new subject, without any exercise of the inventive faculty and without the development of any idea which can be deemed new or original in the sense of the patent law."

In *American Road Machine Co. vs. Pennock*, 164 U. S. 26 this Court sustained the same doctrine, saying in one place that which applies directly to the increase in size of the holder here.

> "The substitution of the heavier wheel was not the product of a creative mental conception, but merely the result of the exercise of the ordinary faculties of reasoning upon the materials supplied by a special knowledge, and the facility of manipulation which results from its habitual and intelligent practice.

That in like cases this Court has not found patentability is shown by the latest reported case touching the subject, *Mast, Foos & Co. vs. Stover Mfg. Co.*, 177 U. S. 485. See especially the discussions (pages 492-94), where, after comparing the prior art as we have above attempted to do, the Court held that the patentee had discovered no new function, invented no new device; and used it for no new purpose, saying:

> "The result may have added to the efficiency and popularity of the earlier device, although to what extent is open to considerable doubt. In our opinion this transfer does not rise to the dignity of invention."

All Mixing Operations Analogous, Difference only in Degree.

The record is full of admissions that it is the same principle of mixing whether two or a dozen or more portions are mixed;——that the same principle applies to the direct metal and cupola metal, or sugar (p. 470);——that the addition of the cupola metal to the blast furnace metal is "equivalent to the admixture of another furnace cast in the mixture" (p. 37);——that it is a mere matter of arithmetic in determining the proportions of impurities in the two bodies and their relative size to know just what the proportions of

impurities in the mixed metals will be. The Circuit Court gives an illustration of this in the opinion (p. 685)

Variation, up or down, is a mere matter of degree and is controlled by the same laws which the druggist follows in concocting a prescription, or the housewife in making a cake.

Generally improvement in degree is not patentable—*Roberts vs. Ryer* 91 U. S. 150; *Dunbar vs. Meyers*, 94 U. S. 187; *Crouch vs. Roemer*, 103 U. S. 797; *Stow vs. Chicago*, 104 U. S. 547; ect.

Improvement in degree by substituting one old material for another old material is not invention—*Hotchkiss vs. Greenwood*, 11 How. 248.

Mere change in size, weight, form, proportion and shape without change in function are not patententable—*Phillips vs. Page*. 24 How. 164; *Smith vs. Nichols*, 21 Wall. 112; *Dalton vs. Jennings*, 93 U. S. 271; *Clark Co. vs. Furguson*, 119 U. S. 335; *Glue Co. vs. Upton*, 97 U. S. 3; *Estey vs. Burdette*, 109 U. S. 663; *Peter vs. Active Co.*, 129 U. S. 530; *Grant vs. Walters*, 148 U. S. 547; *Morgan Co. vs. Albany Co.*, 152 U. S. 425; *Wright vs. Yuengling*, 155 U. S. 47; *American Co. vs. Pennock*, 164 U. S. 26.

This principle is applied in connection with the mere carrying forward of the same idea in all the above cases, and to the same "in a better and more workman-like manner" in *Busel Co. vs. Stephens*, 137 U. S. 423; *Consolidated R. M. Co. vs. Walker*, 138 U. S. 124; and other Supreme Court cases.

This Court has, we believe, fairly settled this question in *Marchand vs. Emken*, 132 U. S. 195, relating to making hydrogen-peroxide, the method consisting in cooling the solution containing certain chemicals, and mixing the same by peculiar movement to aid in the chemical reaction. On the question of invention this Court quoted from the opinion of the Court below as follows:

> "The object of agitating the liquid, while making hydrogen peroxide, is to keep the barium, which is three times as heavy as water, suspended in the acid, so that its particles may come in contact with the particles of acid. Whether they come in contact while going round, rising, settling or remaining stationary, can make no difference. Divest the case of the **air of mystery with which it is environed, and it seems simple enough.** The complainant's predecessors knew that to keep the barium up in the solution they must stir it. The complainant knew this. Unlike them, however, he **manufactured on a scale large** enough to make it essential to employ a power shaft."

Further commenting on the case this Court said:

> "As every device, apparatus, formula, **law of nature,** motion and ingredient adopted by the complainant was old, the patent must be held invalid, unless it can be said that giving to oxygenated water a well known rotary motion springs "from that **intuitive faculty of the mind put forth in the search for new results or new methods, creating what had not before existed or bringing to light what lay hidden from vision**" *Hollister vs. Benedict Manufacturing Co.*, 113 U. S. 59, 72. No such faculty has been tasked in giving form to this patent. * * * The complainant's claim to be enrolled upon the list of inventors is based upon propositions too theoretical and visionary for acceptance."

This case applies so clearly to the present that comment seems unnecessary. It places the mere step of mixing, the only step here involved, practically beyond protection of the patent laws. The case is also very pertinent in showing that this Court is ready to dismiss from consideration the mysteries, such as petitioner has wrapped around this invention, in alleging peculiarity of mixing operation.

Outside of all this the numerous cases discussed above when referring to car wheel practice, notably the "furniture spring "case, *Lovell Mfg. Co. vs. Cary*, and the "glue soup" case, *Leggett vs. Standard Oil Co.*, and the "Mitis" case against this petitioner, discussed in considering the Car Wheel Practice, show that there can be no proper basis of patentability in the mere mixing of a metal while still in the molten condition in which it was produced over the same metal remelted.

Considering therefore the admitted reservoir action and controlling action of the car wheel dominating pool, nothing is left except the matter of degree; and even in the Circuit Court's exclusion of uniformity as against gradual variation, it becomes a mere matter of the degree of mixing. The uniformity of the decisions of this Court showing that such a method would not constitute invention is in strong contrast with the variation of the law attempted by the Circuit Court.

The Shifting Constructions of the Patent Contended for by Petitioner in view of the Showing as to the Prior State of the Art.

Petitioner's counsel in the preparation of its case, as in its presentation, have evidently labored under the misconception of the law which was stated by the late Judge Carpenter, in *Sachs v. Brooks*, 74 F. R., 935, where His Honor said:

> "But I take it now to be the rule that limitations in the terms of the claim do not import any limitation in the construction of the claim in cases where such limitation is not imposed by the state of the art."

They have indeed consistently treated this patent as a mass of putty, or as Mr. Justice Bradley put it, in referring to similar modes of construction, "a nose of wax." For illustrations of the shifting constructions adopted to meet the developing exigencies of the case, we will ask your Honors to note the following:

(1) In the Maryland suit to establish infringement it was shown to include cupola as well as direct metal, cupola being "equivalent to the mixture of another furnace cast in the mixer" (36), and "more metal put in but not other metal; it wasn't a different metal; pig iron from the cupola" (107). In rebuttal their patent was limited to "direct metal," this meaning being given to the words "molten metal" (447). But at the hearing in the Circuit Court Mr. Bakewell admitted that the claim covered molten metal and would include cupola metal.

(2) In the opening testimony the broadest ground was taken that Jones was the first to have attempted mixing molten metal from different furnaces for use in a Bessemer converter, which was "the very pith and essence of the Jones process" (36). In rebuttal it was admitted that in Deighton, Witherow, Cambria, Steelton, South Chicago, and even at Edgar Thomson, itself, this very thing was shown to be old.

(3) In the opening, it was admitted that the principle of mixing was the same whether 2, 4, 10 or 20 units of casts were commingled, and it was a mere matter of degree (38). In rebuttal it was attempted to establish that a new principle was found in pouring small portions into a large receptacle and keeping the vessel substantially full.

(4) In the opening,the position was taken that the invention included pouring *casts*, not limited as to size, into the mixing re-

ceptacle (24 26.) In rebuttal the invention was said to be sub-dividing the cast so as to pour *small portions* into a large receptacle (445.) Though cross-examination showed the fallacy of this posision (466-8), at the hearing in the lower Courts this point was made the main one of novelty, the distinction between Jones and Deighton being principally based on the point. By the disclaimer the only reference to "small portions," a reference only made in connection with the use of a small mixer, is attempted to be erased, so that this distinction was voluntarily given up.

(5) In the opening testimony the object of the Jones invention was stated to obtain "uniformity in silicon" (24-5). In rebutbutal the object of the patent was stated not to obtain uniformity, but to prevent abrupt fluctuations (446; 471; 518; 541; 622), while at the hearings below attempt was made to push Whitney out of the way because its mixed metal was too uniform, and was not "gradual fluctuations linked together."

(6) In the opening, both claims were insisted upon, though because of the obvious invalidity of the first claim this question was raised by respondent's counsel several times (35; 79). Respondent was compelled to meet both claims, and it was not until one hundred pages of rebuttal testimony had been taken that the first claim was waived (459).

The fact that the first claim of the patent was withdrawn is a glaring inconsistency, because under the modes of construction adopted by petitioner's witnesses and counsel it was just as easy to have distinguished the first claim from the state of the art as it is to so distinguish the second claim. In the arguments of the case this was recognized by petitioner's counsel, who, *to avoid the admission that any patent claim owned by the Carnegie Company could be invalid* or anticipated, took the remarkable course of asserting that the claim was withdrawn from the suit because it was not infringed, explaining their position, not by pointing out the obvious distinction between the claimed process and respondent's use, namely, that the first claim is limited to a process of mixing *to equalize*, while the respondent does not so mix, but by the assertion, *inter alia*, that the first claim was limited to a process in which *two mixers were necessarily employed*, (complainant's brief in Circuit Court, pages 22-23; appellee's brief in Appellate Court, pages 23-24) and in which the converter was charged simultaneously from both

mixers. By what process of reasoning they got this limitation into the claim can only be known to themselves.

(7) The first claim of the patent being withdrawn from the case was yet made to serve another useful purpose by petitioner's counsel, namely, that of a *scapegoat*. Preparing and arguing this case, as they did, on the assumption that Judge Carpenter's statement of the law applicable to the construction of patents was correct, they were surprised and *pained* at the course of respondent's counsel in referring to the terms of the specification and claims as having any effect on the construction of a patent; but they finally hit upon the ingenious and, to them, satisfactory expedient of *loading all objectionable passages in the specification, indeed the whole specification, on the first claim*, and all Mr. Jones' sins, both of omission and commission, being thus securely fastened on the scapegoat claim they drove it into the wilderness, in accordance with the Mosaic ritual, and thus presented to the Circuit Court Judge in lieu of a specification a blank sheet upon which his Honor wrote the patent specification describing the invention which he thought the Carnegie Company was entitled to monopolize.

8. The final inconsistency in petitioner's handling the case was its disclaimer. This document must have been prepared during a temporary indecision of counsel as to whether indeed Judge Carpenter's interpretation of the law was correct, or, perhaps, a doubt may have occurred to their minds as to the carrying capacity of the scapegoat first claim. At any rate, whatever motive led to the filing of the disclaimer no explanation as to why it was filed, or what its effect upon the patent was intended to be, was made in either of the lower Courts; at least none that we were able to understand.

But the inconsistencies apparent in the preparation and presentation of this case were absolutely unavoidable. There is no doubt but that the Jones patent was a serious annoyance to both counsel and witnesses, an annoyance which they minimized as much as possible by ignoring it. Mr. Gayley had never read it when he first testified, and admits in his second deposition that he had forgotten it before when appearing on the witness stand. Mr. Frye had contented himself with reading the claim, knowing, as he states, that patent specifications are dry reading. Mr. Kennedy was actually asked by petitioner's counsel to read the patent, but carefully cautioned not to read it as a patent specification, but as though it were

a newspaper, and he evidently understood this instruction to be in effect that he should read it with the same amount of confidence which one would naturally feel in reading a yellow newspaper. The petitioner's witnesses were therefore able to construe the patent without any bias arising from its expressions; but counsel in presenting the case could not overlook the fact that the ruling in *Sachs vs. Brooks* had not as yet been confirmed by this Court, and they therefore thought it expedient to provide two other devices by which the Court could avoid giving this patent a meaning which it obviously bears upon its face, and which we have shown it was clearly intended to bear,—hence we have the scapegoat claim and the mysterious disclaimer which counsel do not attempt to explain but which they hope your Honors will find, in some way or other, to be an excuse for giving to the Carnegie Company a judicial patent as distinguished from the patent issued by the Government.

We submit that the decision of the Circuit Court of Appeals should be affirmed for the following reasons:

1. The patent is not infringed.
2. Respondent simply reservoirs its metal,—a practice known long prior to the Jones invention.
3. The disclaimer is not such as provided for by the statute.
4. It has no effect in narrowing the scope of the patent.
5. The patent is void because anticipated or shown to contain no invention in view of the prior art fully developed.

Respectfully submitted,

JAMES I. KAY,
P. T. DODGE,
FRANCIS T. CHAMBERS,
Counsel for Respondent.